TECHNOLOGY SUP.

Gas Journal

VOL. 290. 109th YEAR. LONDON, MAY 1, 1957. No 4894. PRICE 1/6

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THE OLD WAY

THE WALKER TOWER PURIFIER

introduces a new design into this Country. The plant combines comparatively low initial cost of installation with reliability in working. It is simple to operate and maintenance charges are reduced to a minimum.

SOME ADVANTAGES OF THIS SYSTEM

★ EACH TOWER CONSISTS OF A STACK OF WELDED STEEL TRAYS. NO OUTER CASING OR GANGWAYS ARE REQUIRED.

★ EACH TRAY IS OF ROBUST CONSTRUCTION. THERE ARE NO INTERNAL STIFFENERS TO INTERFERE WITH THE PURIFYING MATERIAL.

★ ARRANGEMENTS MAY BE MADE FOR UPWARD OR DOWNWARD OR SPLIT FLOW OF GAS THROUGH THE PURIFYING MATERIAL.

★ COMPACT ARRANGEMENT OF GAS CONNECTIONS AND VALVES IN BOTTOM OF EACH TOWER GIVING ADEQUATE PROTECTION FROM FROST.

★ RUBBER SEALING RINGS BETWEEN TRAYS ENSURE GAS TIGHTNESS. NO WATER SEALS ARE REQUIRED.

Automation in Purification

TER VALVES ARE USED, FOR GAS CONTROL, WHICH POSITIVE IN ACTION.

ORDERS SHOW FUNCTIONING OF WATER VALVES.

TER VALVES ARE OPERATED BY REMOTE CONTROL. ALTERNATIVELY THEY MAY BE DIRECTLY OPERATED.

VISION IS MADE FOR EASY CLEANING OR REPLACE- NT OF ESSENTIAL WORKING PARTS.

H TOWER IS TESTED TO 80" W.G. AIR PRESSURE ORE BEING PUT INTO COMMISSION.

THE NEW WAY

ASK TO SEE THE DEMONSTRATION VALVE OPERATION PANEL AT OUR WORKS AT DONNINGTON — SHROPSHIRE

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please send us your enquiries

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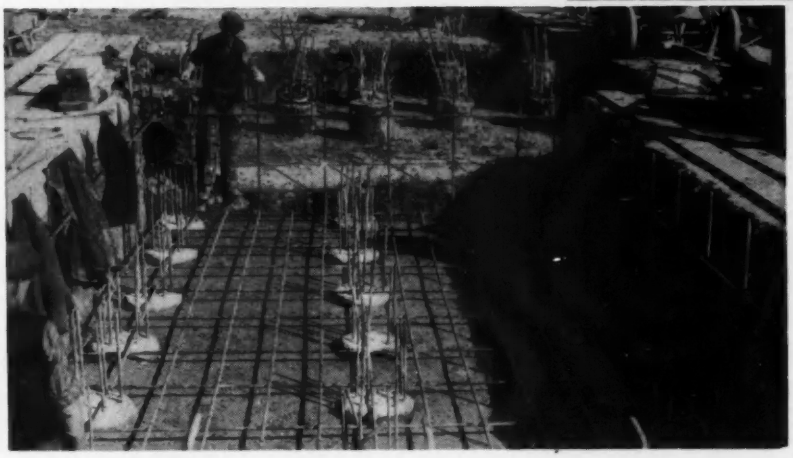

The heavy foundation loading from this building made normal footings for the columns out of the question —a condition frequently obtaining to-day when higher storeys are permitted. Piling was necessary and the close proximity of other buildings, including a Hospital, precluded the use of heavy driving equipment with its accompanying noise and vibration.

Cementation Bored Piles were selected by competitive tender and the foundation work was completed very successfully notwithstanding the difficult ground conditions unexpectedly encountered.

The CEMENTATION COMPANY LIMITED

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FOR USE WITH STATION GOVERNORS

THIS PILOT GOVERNOR IS OPERATED BY AN EIGHT-DAY CLOCK, AND CHANGES THE PRESSURE TO MEET PEAK LOADS, ACCORDING TO REQUIREMENTS. A DIFFERENT LINE CAN BE GIVEN FOR EACH DAY OF THE WEEK IF REQUIRED.

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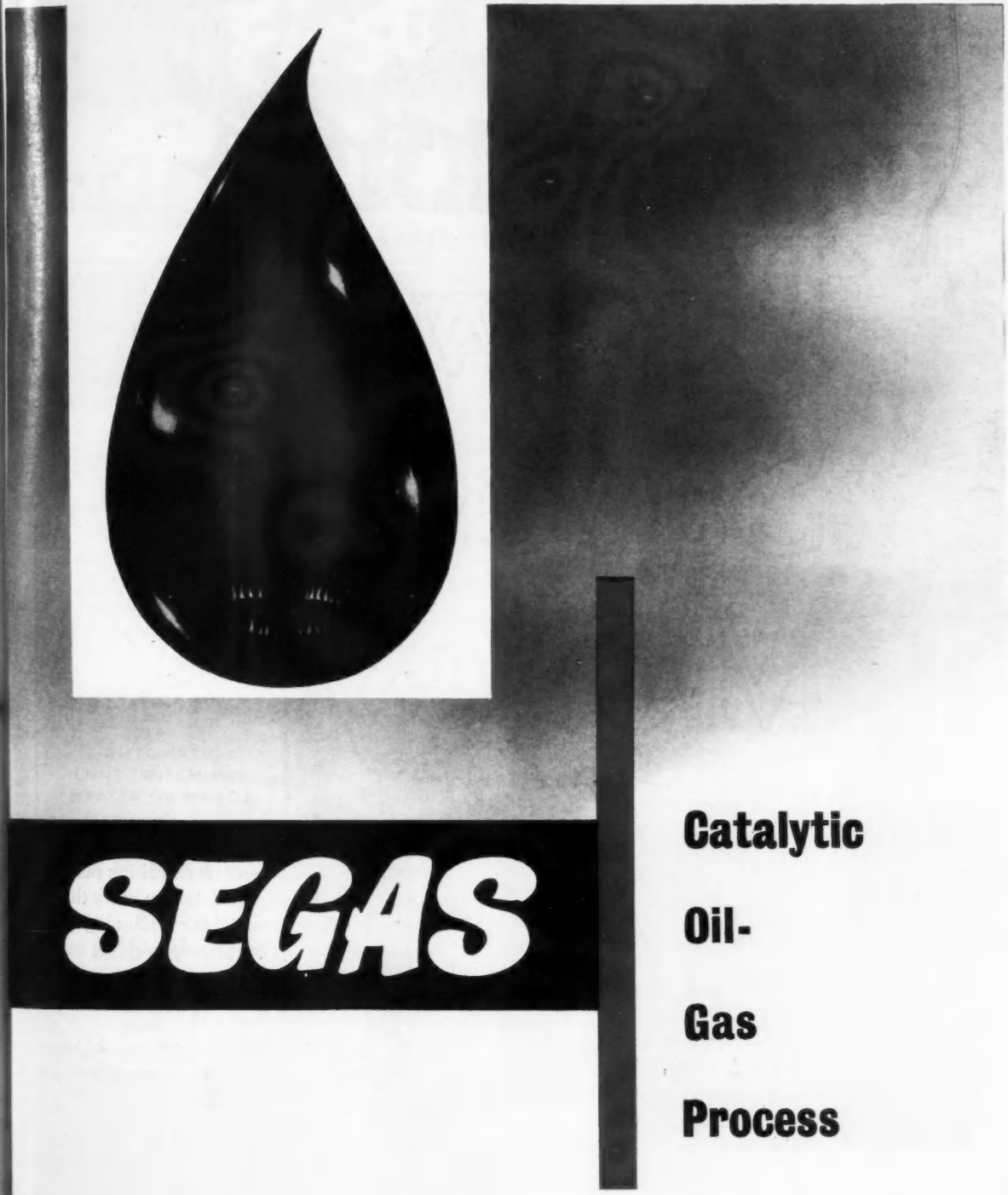

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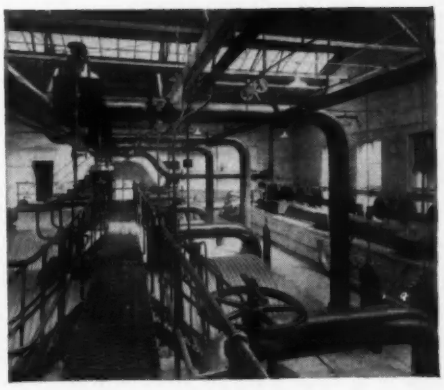

The cost of additional steam raising plant to meet an increasing load, has on more than one occasion been saved by our replanning the pipe-work in conjunction with the fitting of Bolton-Gray Superheaters.

To report on your plant, giving you the benefit of our very long experience, would cost you—NOTHING.

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This unique, robust instrument indicates and controls temperature strictly in accordance with a predetermined time-programme and is used primarily for controlling heating and cooling cycles of furnace-loads . . . it costs much less than conventional electronic controllers and outclasses all of them in accuracy, simplicity and reliability . . .
fully described in our new TRANSITROL Type 994 data-leaflet available on request.

NO THERMIONIC VALVES

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TIME-CYCLE
1 hr. to 720 hr.

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AUTOMATIC LIMIT-SWITCH FOR HEATER OR MOTOR

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BACK COUNTER KITCHEN UNITS

This latest range of catering equipment will undoubtedly fulfil a long felt want and provide big kitchen production in the smallest space.

The adaptability, efficiency and 'eye' appeal of these units will quickly recommend themselves to the discerning snackbar and restaurant owner. The mirror finish stainless steel and cream vitreous enamel will make any catering establishment look richer and add 'showmanship' to cooking.

Adaptable and expandable, these units will keep their sparkling appearance for years.

Why not start now with the basic equipment to suit your immediate needs and add new units as business increases?

COFFEEMASTER

This already well-known unit needs no introduction. In its present form the unit has been remounted on a plinth to bring it into line with the other four units in the range and has a drip tray inset. The Pyrex-lined Milk Urn holds one gallon and the Coffee Urn is capable of percolating one gallon of coffee.

FISH FRYER

This counter Fish Fryer with a stainless hob, has a capacity of 2 gallons of fat and is capable of frying 3 lbs. of chips in 7 minutes. The pan is insulated from the Fryer body; is thermostatically controlled and complete with gas governor. Two wire chip baskets are supplied with the unit.

GRIDDLE

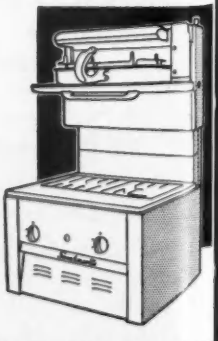
The Griddle has a cast aluminium top measuring 20" × 14". This top is easily removed for cleaning and servicing and a compartment for heating plates is available under. The unit is fitted with spring loaded safety gas cock with low and high positions. The top plate can be heated up to 450 degrees within 20 minutes from lighting up.

FOOD WARMER

This unit can be used for heating up and storing at correct serving temperature a variety of foods since the stainless steel top is fitted with two 10-pint and one 6-pint stainless steel containers. The unit has combined gas cock and thermostat and has a storage compartment under for plates.

BOILING RING UNIT WITH EYE LEVEL GRILL

This unit is fitted with two boiling rings controlled by spring loaded safety gas cock having off, low and high positions. The boiling rings are inset into a stainless steel hob, with plate compartment under. As an added feature of service, this unit can also be supplied with fold-away eye-level Grill mounted over, complete with grill Pan.



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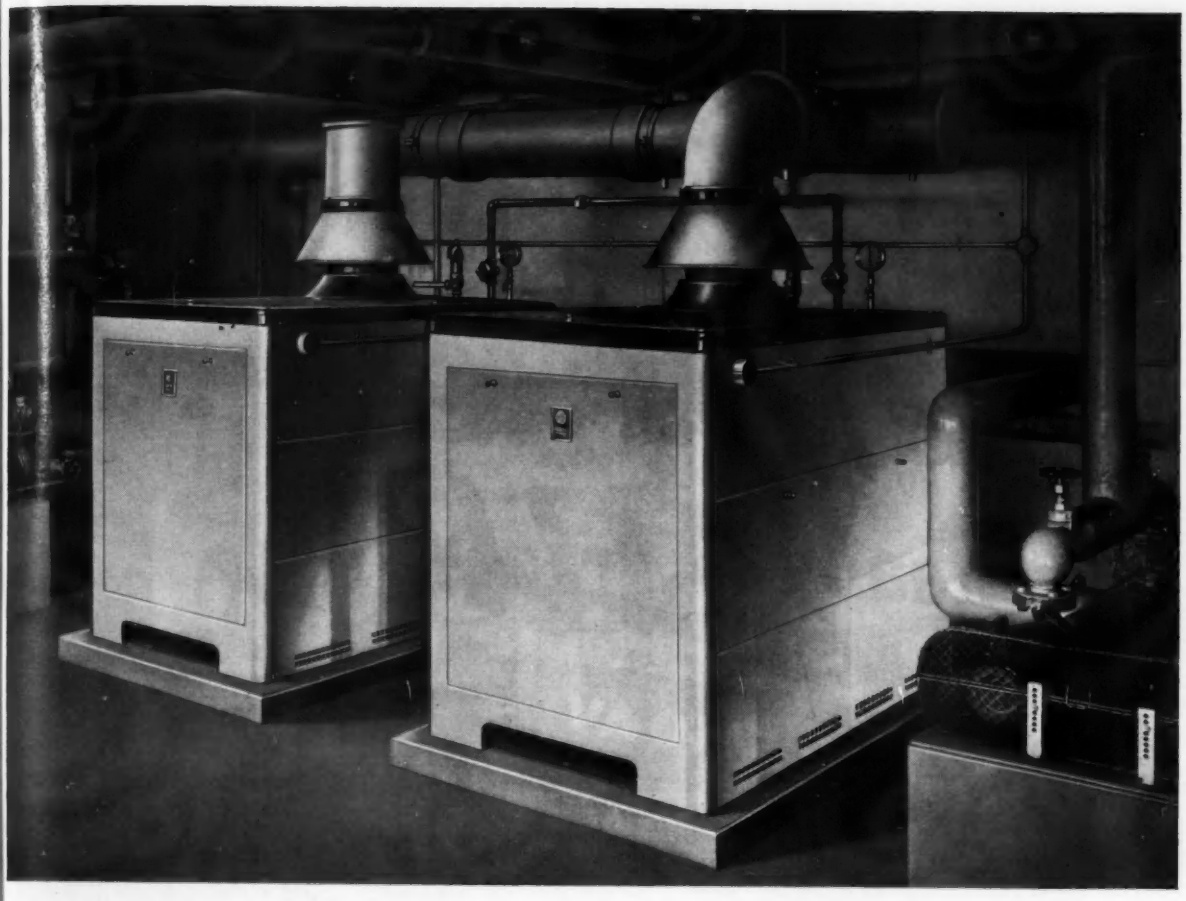

Cleanliness and Efficiency

IDEAL Gas Boilers

Illustrated above are Ideal Gas Boilers installed, for central heating and indirect hot water supply, in the recently completed extension to a hospital.

Cleanliness and a healthy atmosphere are essential to a hospital, and it is therefore important that the heating boilers are fired with a smokeless fuel. In such circumstances, no better choice can be made than Ideal gas-fired boilers. Many years of research work and experience have resulted in the present satisfactory designs.

Ideal Gas Boilers are equipped with complete thermostatic controls, have insulated jackets of steel or aluminium in appropriate finishes and are available in 22 sizes from 20,000 to 1,430,000 B.T.U.'s per hour.

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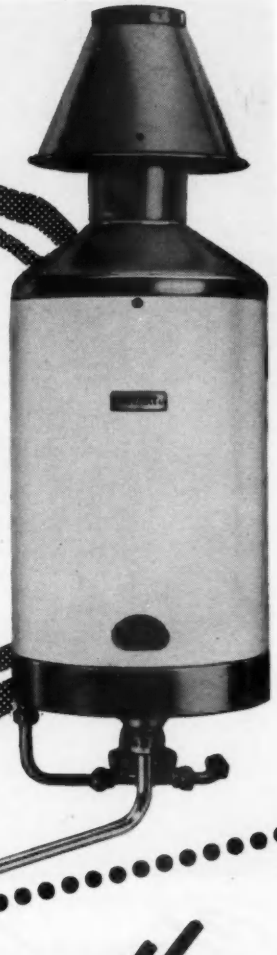
The bath water heater you can really SELL!

the Ewart S.140 AV



The famous Ewart S.140 has always been the lowest priced instantaneous bath water heater on the market. Now, newly re-styled as the Ewart S.140 AV, this easy-to-sell heater is better than ever—and stays as cheap as ever!

Improved manufacturing techniques have enabled Ewart to add to the S.140 these important new features:—

1 AUTOMATIC VALVE
2 PILOT SAFETY DEVICE
3 BUILT-IN VOLUMETRIC GAS GOVERNOR

at no extra cost!

Top value for safety, reliability and money—that's the Ewart S.140 AV. And that's why the introduction of this splendid heater presents the biggest opportunity for years for gas salesmen to sell bath water heating by gas—the *EWART* way.

Display the Ewart S.140 AV in your showrooms. Full details and specification available on request to the manufacturers.

with *three* new features giving added safety for the same low cost!

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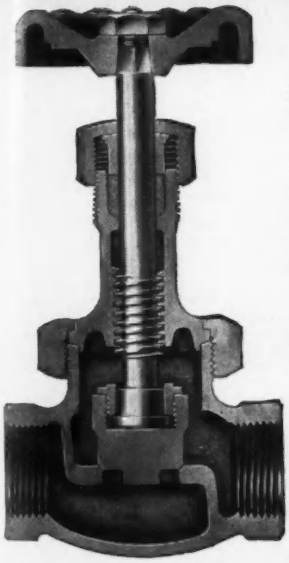

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Sizes: ¼"—2" (2½"—3" Bolted Bonnet). *Working Pressures:* Steam—up to 200 pounds. Water, oil or gas (cold, non-shock) up to 400 pounds. Hexagon ends with British Standard taper threads or to American Standards where specified.

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D 52 PLUG TYPE DISC—UNION BONNET
with *renewable* Nickel Alloy Disc and Stainless Steel Seat Ring. *Sizes:* ¼"—2". *Working Pressures:* Steam up to 300 pounds (550°F). Water, oil or gas (cold, non-shock) up to 1,000 pounds. Hexagon ends with British Standard taper threads or to American Standards where specified.

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D 180 NICKEL ALLOY WEDGE DISC—
Union Bonnet, Integral Seats, Rising Stem. *Sizes:* ¼"—2" (2½"—3" Bolted Bonnet). *Working Pressures:* Steam—up to 200 pounds (500°F). Water, oil or gas (cold, non-shock) up to 400 pounds. Hexagon ends with British Standard taper threads or to American Standards where specified. *Also available as D.181 with Stainless Steel Seats.*

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Regrinding Horizontal Valves D 115 (200 pounds) and D 122 (300 pounds) and Swing 'Y' Pattern Valves D 142 (200 pounds) and D 145 (300 pounds) are recommended for use with both globe and gate valves.

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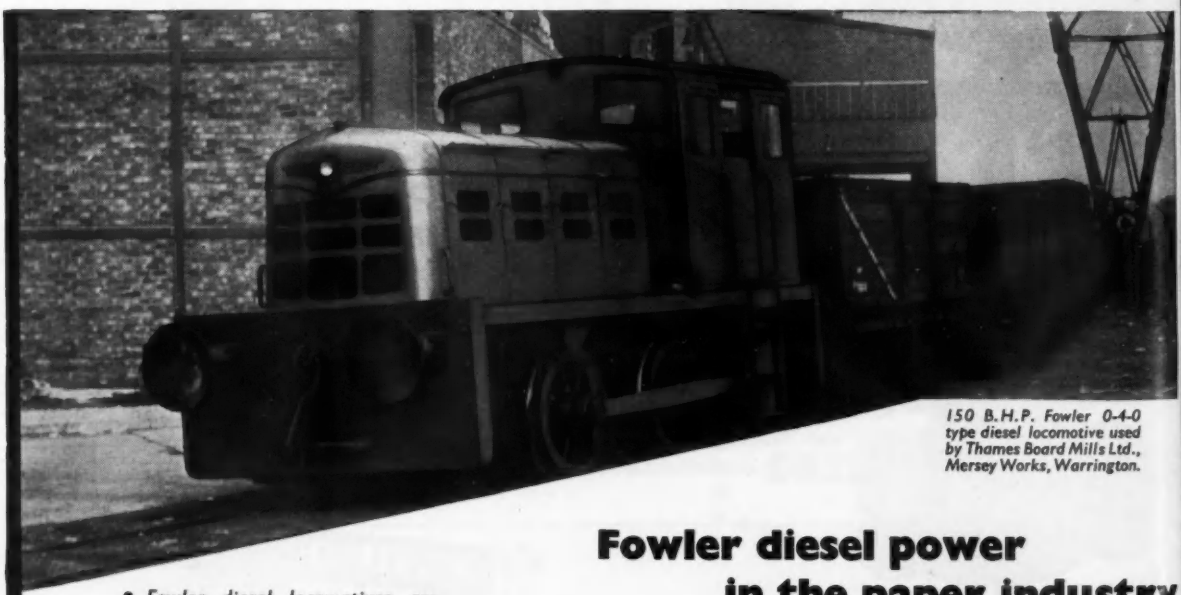

150 B.H.P. Fowler 0-4-0 type diesel locomotive used by Thames Board Mills Ltd., Mersey Works, Warrington.

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- *Fowler diesel locomotives are ideal for all industrial purposes, general or specialised.*
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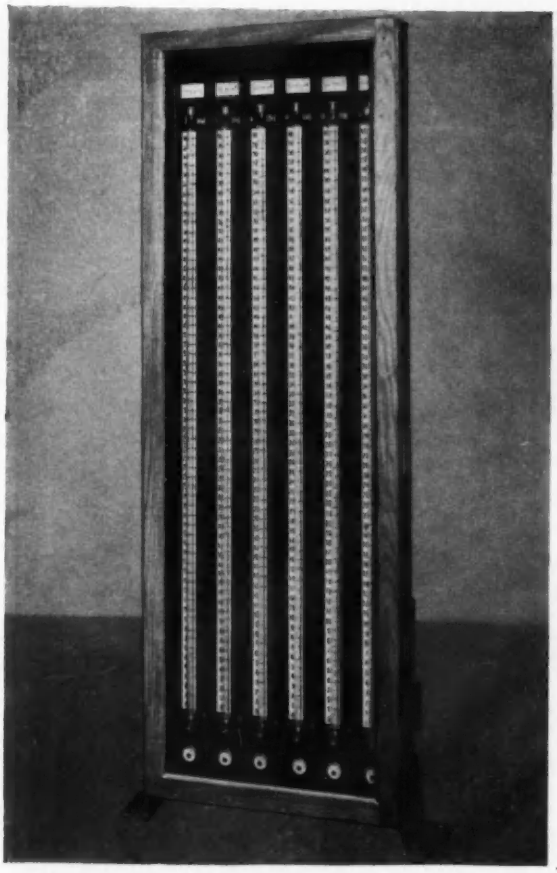

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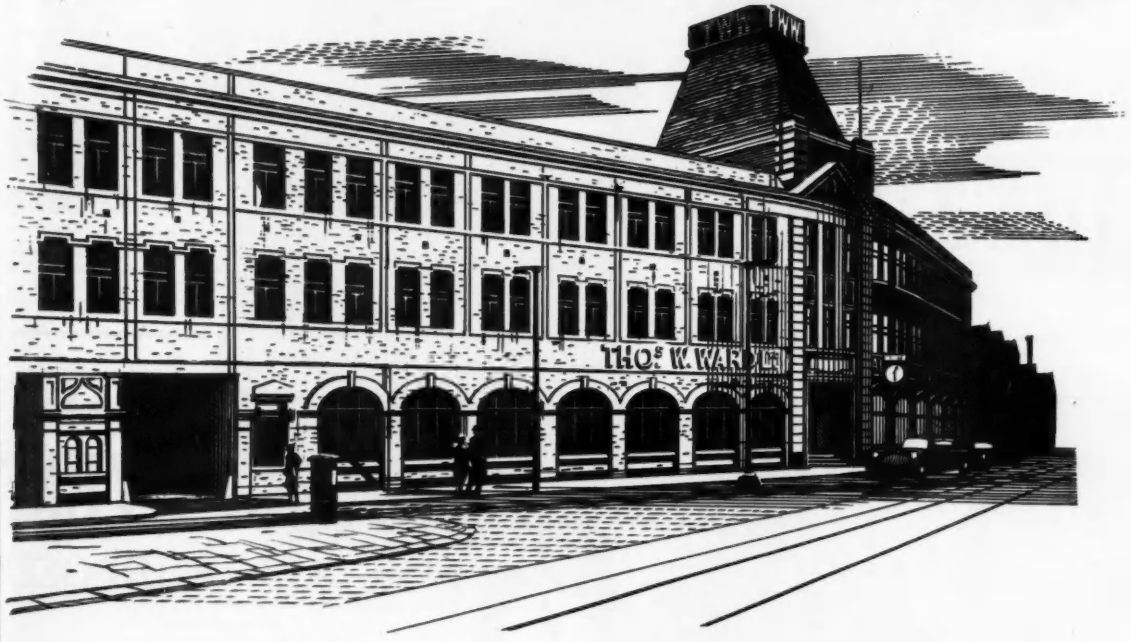

Here is an impression of the tiny building in Sheffield where the company now known as Thos. W. Ward Ltd., had its small and uncertain beginnings. Here, too, is pictured an organisation whose interests are now world-wide. The one looks sentimentally back, the other purposefully forward. But, whatever tomorrow may bring, the principles of the past must remain the imperatives of the future — enterprise and service. On these fundamentals the Ward Organisation was founded, has flourished and will continue to rely.

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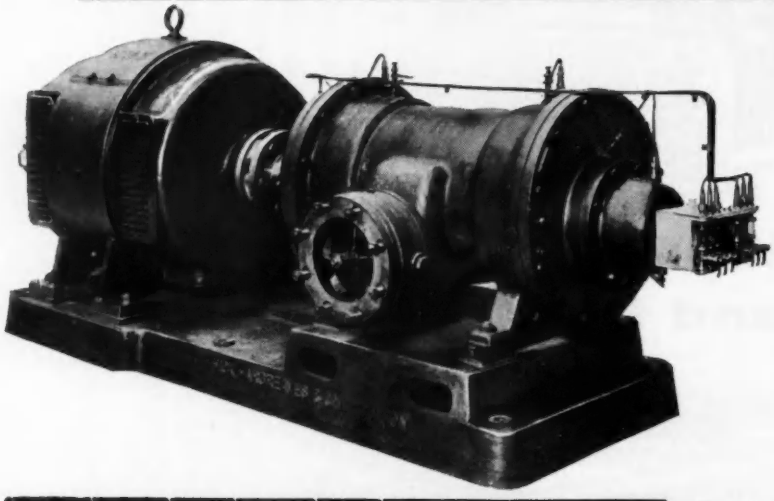

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EASE OF INSTALLATION
MINIMUM MAINTENANCE
NO SUCTION VALVES
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The illustration shows an air-cooled Compressor for 15 p.s.i.g. Also available as a water-cooled machine for h.p. distribution.

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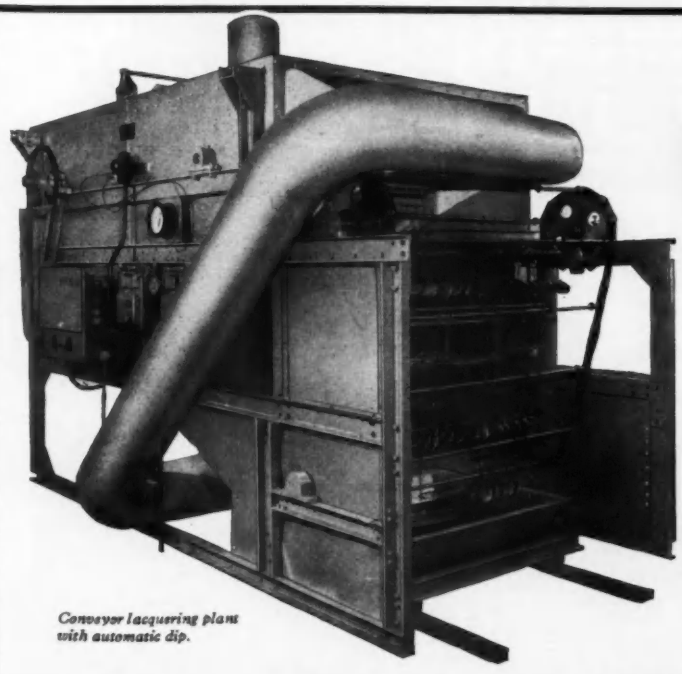

Conveyor lacquering plant with automatic dip.

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CONVEYOR ENAMELLING PLANT

ALSO MANUFACTURERS OF STEEL PLATE GAS MAINS AND FABRICATED STEEL STRUCTURES FOR THE GAS INDUSTRY

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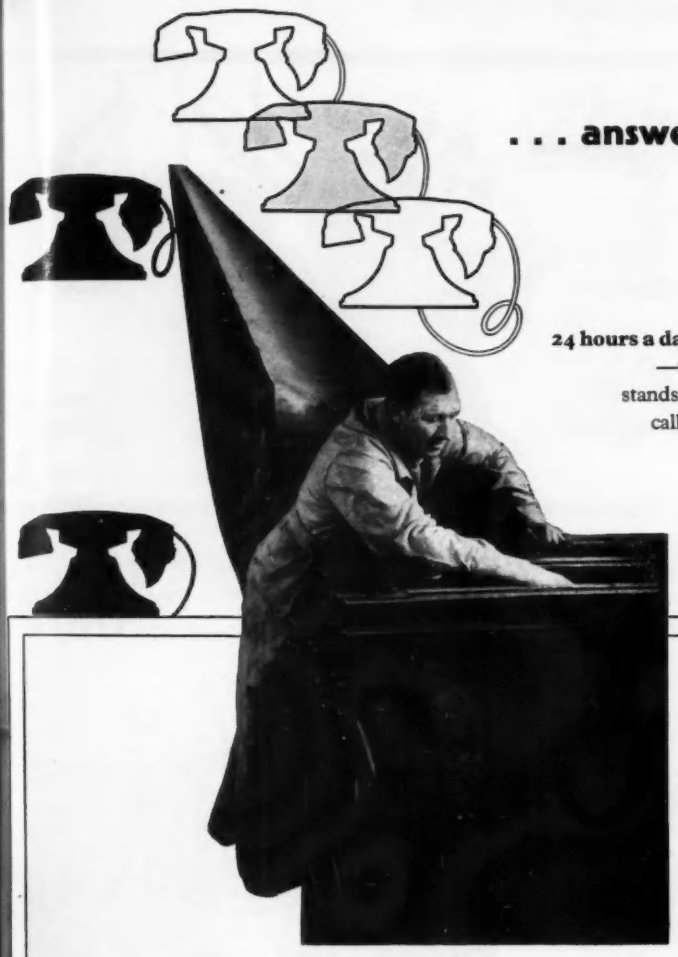

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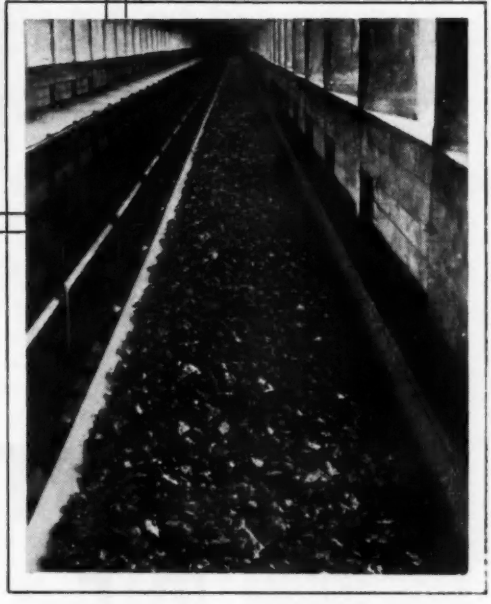
24 hours a day . . . 7 days a week . . . and with nationwide coverage —the BTR MOBILE CONVEYOR BELT SERVICE stands ready for *your* splicing and repair instructions. The call from Tottenham Gas Works brought these facilities into action—all the belts at the vast new extension were spliced "on site" with minimum delay. The BTR service, manned by skilled and experienced belting engineers using modern portable equipment, ensures efficient and economical conveying. Dial now — and the BTR Mobile Conveyor Belt Service will be at your disposal.



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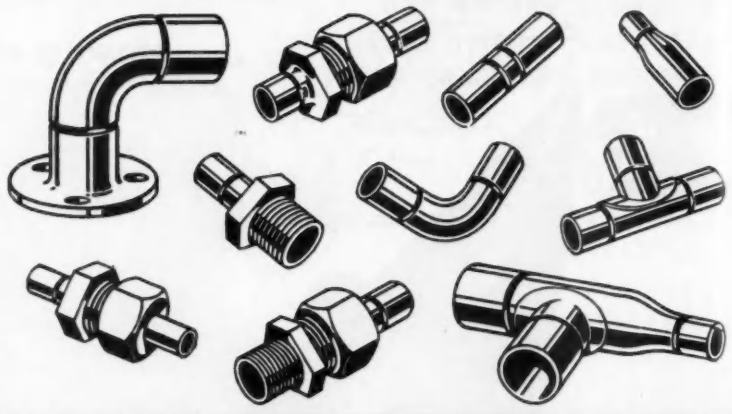
A full range from $\frac{1}{8}$" diameter available from stock. Full details upon request.



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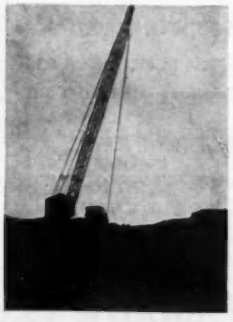
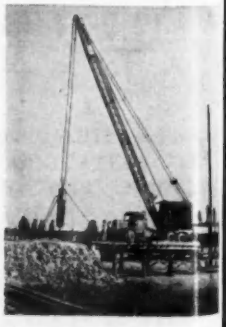
Here is ONE machine doing the work of many. The SMITH 15-ton M.E. Crane can be used for an amazing number of lifting and digging duties. Minimum boom length is 30 ft., but this can be increased up to 100 ft. by means of extra sections, quickly secured in place.

The M.E.C. using minimum 30ft. jib in positioning storage tanks.

How's that! The massive storage vessel lifted with ease.



Excavating duties!. The SMITH M.E.C. working as a long-radius dragline.



Piledriving in preparation for a new jetty in the Middle-East.

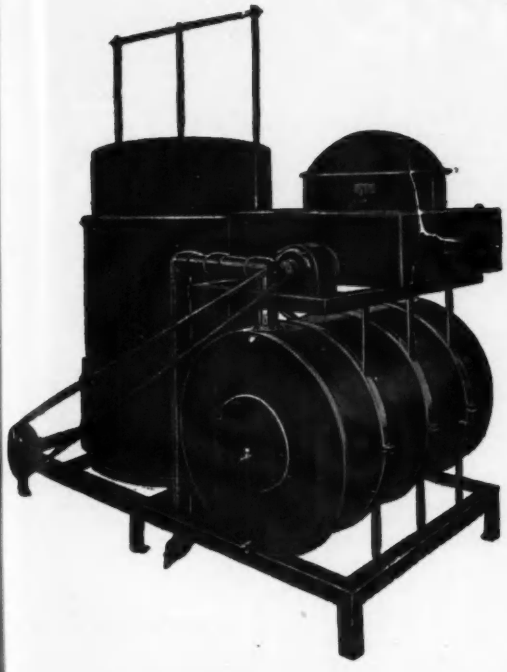
Excavating with a speedy rope crowd shovel.

SMITH M.E. CRANE

THOMAS SMITH & SONS (Rodley) LTD., RODLEY, LEEDS, ENGLAND

AEROGEN GAS GENERATORS

(300 B.T.U's per cubic foot)



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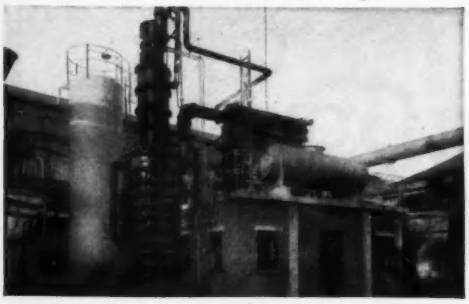

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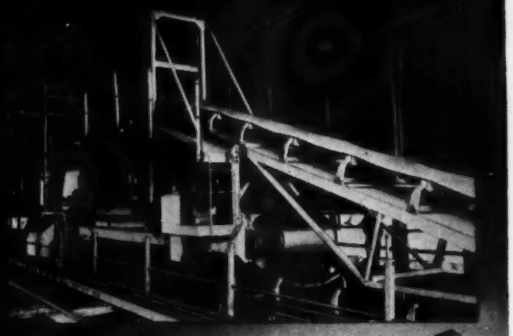

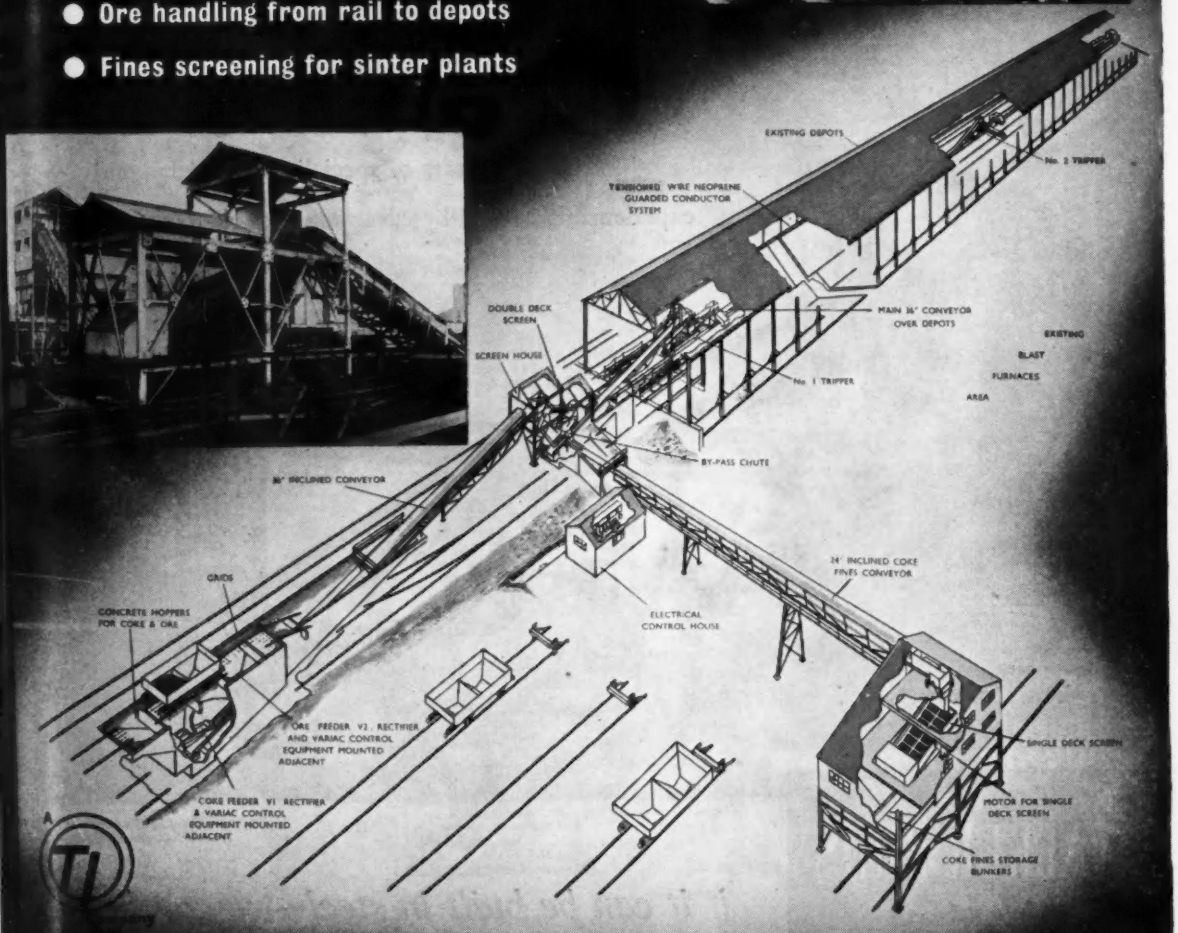
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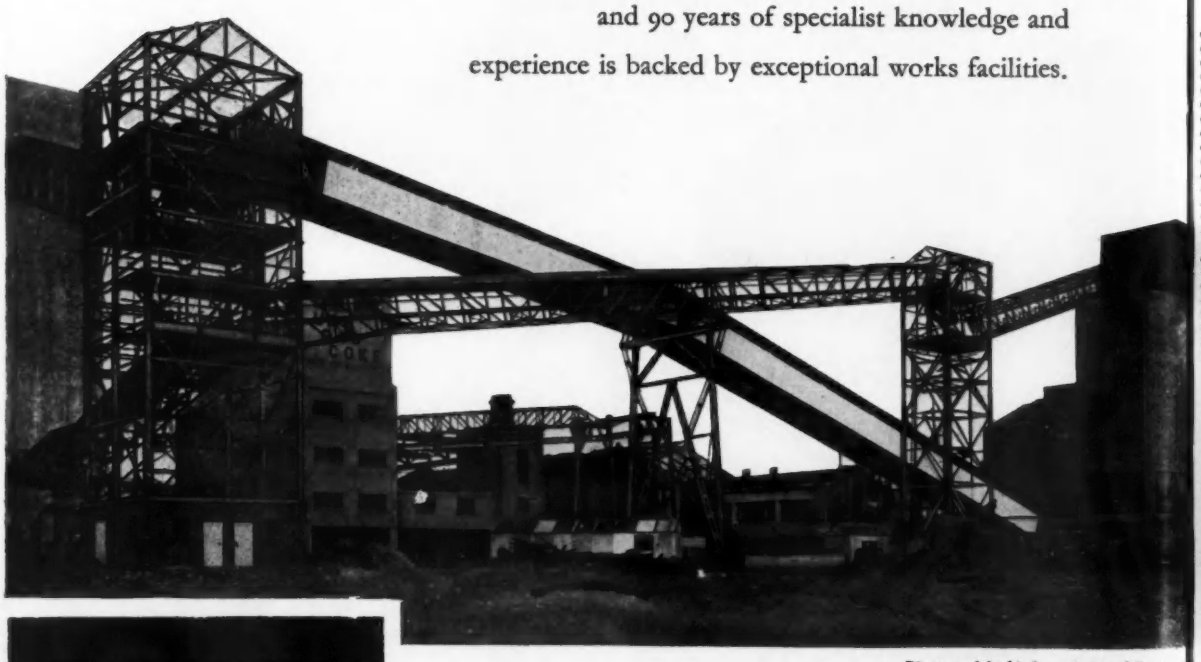

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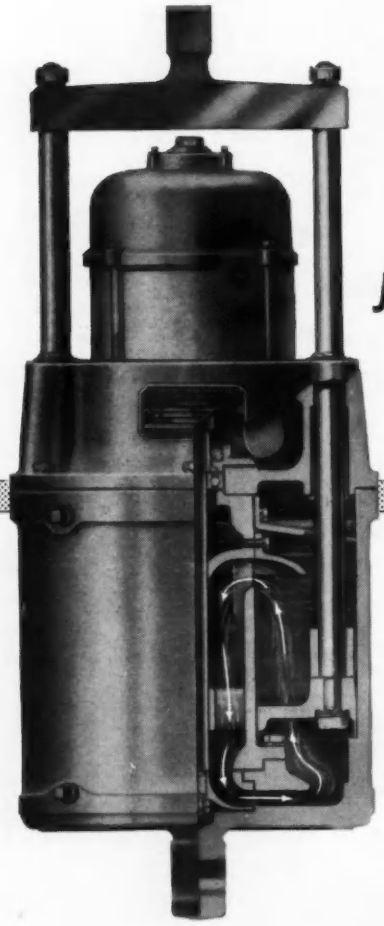

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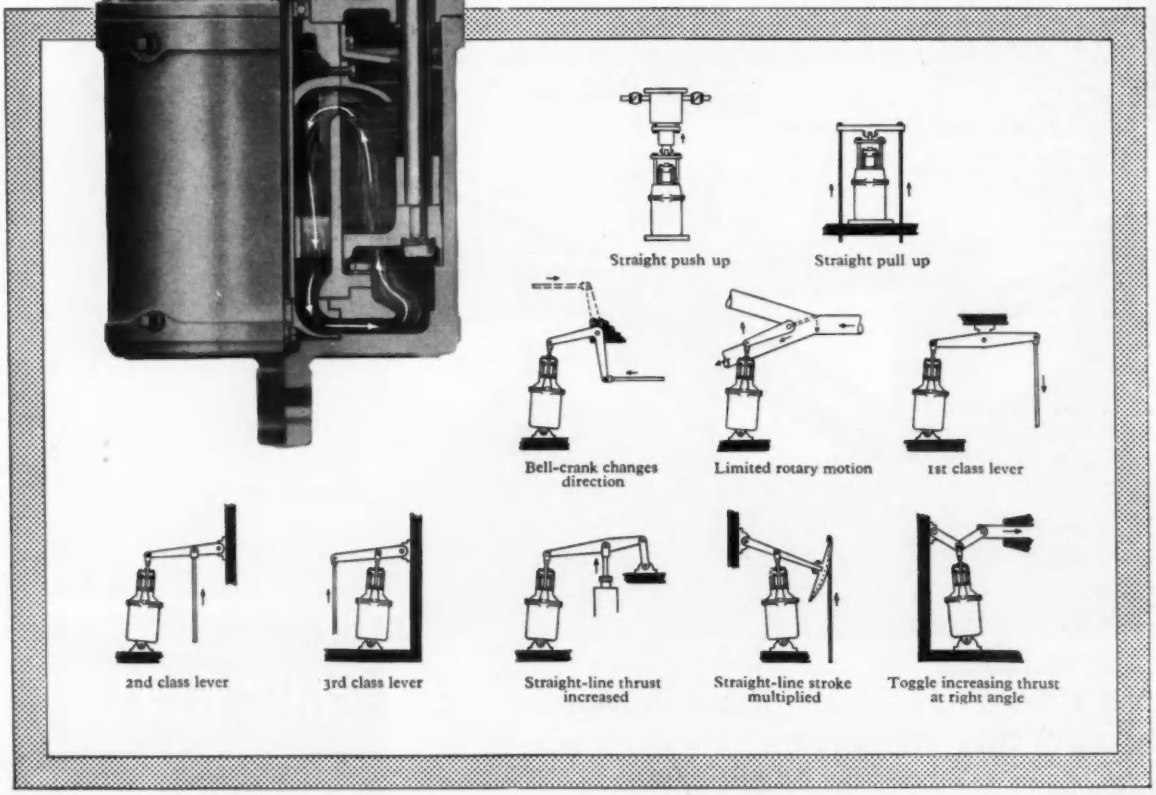

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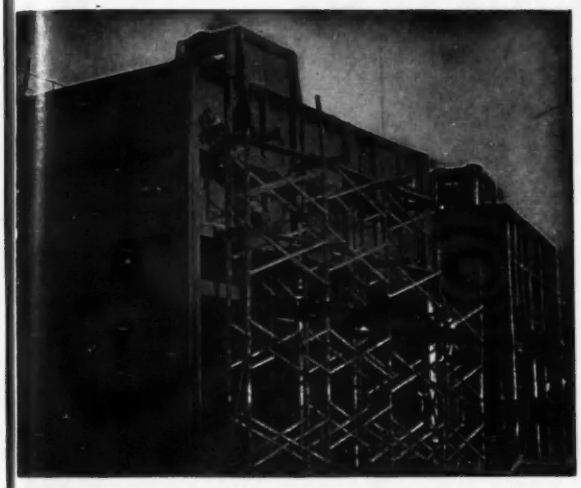

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VOL. 290 NO. 4894 May 1, 1957

109TH YEAR

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Gas Journal

VOLUME 290. No. 4894. MAY 1, 1957. 109th YEAR

Candy Floss and Ethics

THOSE who looked to the Presidential Address of the Institute of Fuel for some constructive comment on the fuel situation today must have been seriously disappointed. Mr. J. R. Rylands made use of this very fine opportunity for inspired guidance to indulge in a somewhat fanciful enquiry into the objects of the Institute and to show that technology is inseparable from ethics. His address was a welter of whimsy, entertaining, often amusing, but having no more substance than candy floss. Without intending any personal offence we cannot help likening Mr. Rylands to a prize cow which, backed by a first-class pedigree, and full of promise, is turned out to graze in a great lush meadow; when the farmer with pleasant anticipation brings it into the milking shed it is only to find that the bucket is empty!

Clearly Mr. Rylands is preoccupied with the essential difference between science and technology and the responsibilities attaching to each. The duty of the scientist, he says, is to pursue and make known the truth about the universe, so far as it is possible to find it out; the technologist appreciates the truth made known to him and proceeds to apply it to use. He instanced the scientist who discovers the secret of nuclear fission and the technologist who builds a nuclear power station or makes an atom bomb. The scientist can disclaim responsibility for the use of his discovery since much knowledge can be used either for good or ill. But, he asks, can the technologist in his turn divest himself entirely of moral responsibility? He may claim that he works under the direction of higher authority, but that does not free him from responsibility. 'We seem to be led inevitably to two conclusions. First, that no technology can nowadays be regarded completely as an end in itself; there are ethical considerations inextricably involved in the notion of utilisation, because this involves human relationships. Secondly, whereas the moral duty of the scientist may be regarded as limited to pursuing the truth, irrespective, as it were, of consequences, the technologist cannot evade a far wider measure of moral responsibility in the use he makes of acquired knowledge.'

Now it is right that Mr. Rylands should give some thought to such matters but surely his conclusions are very obvious ones. It is difficult to imagine that technologists are blind to their moral responsibilities.

From ethics he turned to fuel efficiency and its incentives. 'If we consider the effect of large-scale combinations of industries and in particular of nationalisation, we observe again the removal of the incentive of direct personal gain from the field of fuel efficiency. The man who decides whether or not to introduce this or that economy measure does not benefit personally in the same manner as the mill-owner of half a century ago. He may pursue fuel efficiency because he thinks it proper to do so, or because there is a crisis of some sort or because he has received orders to that effect from enlightened higher authority. But the powerful urge of commensurate personal material gain has gone, and is unlikely to reappear. Indeed, it would seem that personal gain may nowadays be disregarded as a major factor in securing fuel efficiency by any but purely domestic consumers.'

In an attempt to find an incentive Mr. Rylands goes back to Sir Oliver Lyle's paper on 'Inefficiency,' presented to the Institute in 1946. In that paper it was suggested that since both exhortation and personal gain could be discarded as incentives the solution was to lay a heavy excise duty on fuel. But, says Mr. Rylands, since rising fuel costs and inflationary tendencies would seem to be inseparable, could not the process be reversed? Instead of laying a heavy excise duty on coal, why not bring down its price by a substantial subsidy? The result would be cheaper power, transport, manufacture, lower prices, and a check to inflation. But to avoid the waste which would be the obvious result of cheap fuel he suggests *rationing*, and main-

tains that it is in making the best use of the ration that fuel technology would come into its own.

'Is it a dream?' asked the President. To us it sounds uncommonly like a nightmare.

Problems of Purification

THE purification of town gas from sulphur compounds, both inorganic and organic, appears to be a perennial problem and the gas engineer is never really able to say to himself that the problem has been solved and that he need have no further worries A great deal of research has been done in recent years on the mechanism of the chemical reaction between 'oxide' and unpurified gas, which has added greatly to the known facts of what goes on in the purifiers, whether they are the conventional box or the more recent tower type, but there always seems to be something individual about each purifier plant that interests the engineers in charge of it. Since a study of the particular characteristics of the plant under consideration not only helps those whose duty it is to make certain of its efficient working but can also add to the general knowledge of the subject, a paper dealing with gas purification is always of interest

Recently we dealt with a paper, the main theme of which was the working up of oxide in tower purifiers to a saleable quantity of sulphur and comparing their ability to do this with the conventional box purifier. In this paper the author put forward a somewhat unusual point of view—that if a purifier installation was looked upon as a means of producing suitably spent oxide for sale, the purification of the gas would more or less look after itself. This was a valuable point of view and really seemed to solve the problems confronting the engineers in charge. Apart from anything else, it did enable a quantity of partly spent oxide which had been cast on one side without much hope of profitable disposal to be put through the tower purifier plant, and be fully fouled and converted to a saleable product. This is one aspect; there are others.

In a paper from which we publish an extract this week, 'Operation of Tower Box Purifiers,' by Mr. R. Bairstow, an account is given of the operation of tower box purifiers in the North Thames Gas Board. This particular type of plant (of which there only seem to be three installations in Great Britain, two of them in the North Thames Gas Board) appears to offer certain advantages over some other systems, but shares disadvantages common to all purifier installations, namely uneven distribution of gas throughout the layers of oxide, and the corrosion of steel work at vital points.

Of the advantages of this system of tower purifiers, perhaps the most outstanding are the ease of handling of the trays of oxide and consequent reduction in the labour necessary, and the saving in time between taking a tower out of the gas stream and putting it back, together with a very great reduction in back pressure. This last point is most noticeable since only a total back pressure of 6 in. W.G. was measured across an installation of six tower boxes capable of handling a load of 7.5 mill. cu.ft. per day.

The paper describes the emptying and recharging of the trays and how this can be done most easily. The conventional method might be to tip the oxide out of the trays and recharge with revivified semi-spent material; with the oxide handling installation at the Southall plant, however, it has been found that it is unnecessary to do anything more to semi-spent oxide to revivify it than to pass it through the disintegrator, moisten it and return it to the trays. The very great saving in time is immediately clear, but even this operation can be analysed further and there are three alternatives: To empty a tray, place it in a position to be filled while a second tray is hoisted into position for emptying, and then replace it; to stock all the full trays and empty them in turn, refill them and replace them in a stocking tower; or thirdly, where time is important, to empty a tray into the crushing plant and immediately refill it with the same oxide, properly revivified and moistened.

The problems of handling large quantities of an unpleasant material like spent oxide is one that faces the great majority of gas undertakings today, since suitable labour for such work is both extremely scarce and expensive when available. Indeed, a factor which influenced the decision to install this particular type of plant at Southall was the difficulty of getting gangs of 12 men to empty the ordinary box purifier. With the tower box installation a gang of four men can move a charge of oxide amounting to 350 tons and spend only three days on the job, from taking the purifier out of stream to putting it back to work again.

A further advantage of this system is the absence of a special stocking tower. By manipulating valves the flow of gas to any section of the installation in any desired order can be easily achieved, which makes it possible to use any tower as a stocking tower, or to avoid the use of a stocking tower altogether. This is particularly important where the whole plant must be in use in time of peak demand.

The bugbear of corrosion, common to all purifier plants but particularly prevalent when the plant is built of mild steel instead of cast iron, has been the subject of much research in the last 30 years during which many means of protection have been tried. Many forms of protective covering for mild steel plates have been tested, from bituminous paint to sprayed concrete, but with indifferent success. The corrosion appears to be due to the action of sulphur on the exposed metallic surface in the presence of moisture but independent of oxygen. Since the proportion of moisture varies from tower to tower and even from tray to tray, and depends to some extent on which taker position the tower happens to be, this problem of corrosion could prove serious; in fact, it might cause a tower to become ineffective or at least inefficient. The use of special alloys for the tray bottoms may be the only solution to the problem.

Progress Report

'SEVENTH year round-up,' a report on the progress of Britain's gas industry, has just been published by the Gas Council. Among other interesting information it tells that increased efficiency is saving 2 mill. tons of coal a year against the efficiency level of 1948; that since vesting day £318.8 mill. have been invested in the industry; and that although the costs of the gas industry since vesting day have increased by approximately £135 mill. p.a., the industry has only increased its charges to consumers over that period by £120 mill. This is a useful bit of publicity.

Solid Fuel Delivery and Storage

THE increasing use by the public of coke which must follow the passing of the Clean Air Act and the greater space which its storage requires is one of several reasons why the enquiry into solid fuel delivery and storage just completed by a joint committee appointed by the London Regional Committee of the Coal Utilisation Council and the London branch of the Institute of Housing was most timely. The report of this joint committee has now been published and contains a review of the problems involved in so far as London flats are concerned and makes suggestions for overcoming them. It deals with trends in flat construction, coal trade practice in the delivery of fuel, access to flats, stairs, passageways and lifts, and questions of fuel storage. Among the recommendations is a suggested conference to discuss the findings of the report and to make recommendations for action by housing authorities and the building industry to improve fuel storage and delivery facilities. This recommendation has been adopted and a conference for delegates from all over the country has been organised by the Coal Utilisation Council with the co-operation of the Institute of Housing, to be held in London next month.

As a glance at the illustrations contained in the published report brings home, the fuel delivery man coping with existing conditions has many problems to face. Recommendations of the Committee include planning of site layout schemes to allow delivery lorries to approach close to buildings to reduce the total length of carry, that the minimum width of stairs and passageways should be 3 ft., increased to 4 ft. 8 in. at the point of fuel delivery, and that clearance to the ceiling should be 7 ft. 6 in.; and that in high flats without lifts a bar or shelf 3 ft. 10 in. high for resting a full sack should be provided at intervals on landings. These suggestions amount to common sense; that they have to be made reveals lamentable lack of thought in the past. We also agree that carmen should not be expected to carry fuel via stairs to above the third floor of a building and that new structures should be designed with this in view. We also endorse—with feeling born of practical experience—the view that the small capacity of fuel stores in flats is a major defect of design; the minimum provision, says the committee, should be for 6 cwt. of coke or four weeks' supply, whichever is the greater. There should also be additional storage at ground level to permit summer stocking of fuel. Another excellent suggestion is that there should be urgent investigation and practical experiment in the delivery and storage of solid fuel to flats in returnable and non-returnable containers, a development which has been carried out with considerable success on the Continent. We look forward to some tangible results emerging from the coming conference.

Second Thoughts on T.V.

THE gas industry's first tentative dabbling in the new sales medium of television was not very successful, but it would be a pity if that were allowed to discourage the industry from making further attempts. The situation is changing very rapidly, partly as a result of improving technique and an audience which grows weekly, and partly because viewers, even the most critical of them, are fast becoming conditioned to seeing advertising of this type. At first the advertisements appeared brash and irritating, but familiarity, far from breeding contempt, is inducing something akin to affection. Certainly viewers are responsive to advertisers' exhortations—indeed, the whole thing smacks of mass hypnosis. Evidence suggests that even those viewers who publicly ridicule T.V. advertisements are influenced by them. Remarkable as this undoubtedly is, we should not be surprised. The same thing happened in America, and any hopes we may have cherished about the British being less easily influenced and more stable than our American cousins are fast being dissipated.

Of course, sucessful as T.V. advertising is becoming—a fact which is fully supported by a mountain of evidence—it cannot work its magic unless the product is right; that is why any further excursions gas might make into the field must be very carefully considered. It would appear to us that the secret lies either in plugging a simple name which catches the eye of the ordinary shopper or giving some quick visual proof of the quality of the product. With gas it is the latter point which is most significant. Water heating (the turn of the tap and the resulting clouds of steam) and cooking (close-up of the hotplate burner showing fine control and immediate result) would seem to be the best proposition. We suggest that the time is ripe for gas to have another go.

If it is decided that gas should indeed re-enter the lists we hope action will be taken swiftly. We have a feeling that undue delay might be a great mistake.

New B.S. for Inset Coke Fires

A NEW British standard—for dimensional and constructional requirements for coke-burning inset open fires without boiler and without convection (B.S. 2845:1957)—has been published. The use in ordinary homes of open coke-burning fireplaces is becoming more popular, and will become increasingly so as more smokeless zones under the Clear Air Act are established.

The most important feature of this new British Standard is that the specified dimensions and constructional requirements for coke-burning fires will by themselves be sufficient to ensure satisfactory performance in terms of heat generation, fuel consumption, and the maintenance of a 'lively looking' fire. With other types of fires, some kind of performance test is required to check that they function satisfactorily. Coke fires made in accordance with B.S. 2845 avoid such a performance test and they are included in the Ministry of Power's approved list of appliances for local authorities.

Detailed contents of the new standard include requirements for fixing the fire to the hearth, the design of the bottom-grate, fuel capacity, air control, the ashpit and ashpan, and for a gas-ignition burner (for which a concealed connection is recommended). Advice is also given on the use of an inset (*i.e.*—fixed) to replace the open fire of an existing back boiler installation. In order, however, not to restrict the scope for variations in design, the standard is confined to essential features, notably dimensions, which control performance.

The standard requires that an operating tool (or tools) should be provided so that the user may safely carry out operations which would otherwise mean touching hot surfaces with the hand.

Among the clauses on marking is one which requires the maker to state whether the fire is 'intermittent' or 'overnight,' as well as to provide identification marks and the number of the new standard.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2,aPark Street, London.

Personal

MR. L. C. HANSEN, M.B.E., who has been a part-time Member of the North Thames Gas Board since vesting day, has retired. In succession to him the Minister of Power has appointed ALDERMAN W. D. GOSS, O.B.E., to be a part-time Member of the Board with effect from May 1.

MISS F. M. MEARING and MR. H. E. ROBINSON have been appointed deputy joint Managing Directors to Mr. A. Docking, the Managing Director of Radiant-Heating, Ltd.

MR. W. NICOL BAIRD, Manager of the Perth group of undertakings, has been appointed General Manager of the Central Division, which embraces Perthshire, Angus, and Fife, and other counties. His headquarters will remain in Perth. He will be in control of seven groups in the Central Division, in which there will be one major manufacturing station. In order to effect economies, it is proposed to close down 26 stations within the next few years and bring them into a grid scheme. Mr. Baird is a native of Edinburgh and a graduate of Edinburgh University. He went to Perth in 1940 as Engineer and Manager of the Corporation Gas Department. His appointment as Group Manager took effect in 1949, when the gas industry came under nationalised control. MR. A. M. MITCHELL has been appointed Distribution and Consumers Service Engineer of the new Glasgow and Western Division. He is a Dunfermline man and received his initial training at Dunfermline Corporation gasworks. He held several managerial posts in the gas industry before being appointed Distribution Engineer and Sales Manager of the Lanarkshire County gas undertaking in 1946. After nationalisation, Mr. Mitchell was appointed Divisional Distribution Engineer, and subsequently became Divisional Sales and Service Officer of the Lanarkshire Division. He is a member of the Institution of Gas Engineers. MR. SAM K. PATTERSON, who has been District Manager of the Dumbarton-Helensburgh district, has been appointed Production Engineer of the Glasgow and Western Division. He also is a Dunfermline man, receiving his early training at Dunfermline Corporation gasworks, and in 1945 was appointed Assistant Engineer and Manager at Galashiels. Later he went to Cambridge as Works Engineer and was appointed to Dumbarton in 1952.

MR. L. HALSEY, Sales Manager, National Benzole Company Ltd., has retired. Mr. S. Tindale, Assistant Sales Manager, becomes Sales Manager, Consumer Trade. MR. D. A. SHAW, Manager, South-East London Branch of Shell-Mex and B.P. Ltd., becomes Sales Manager, Retail Marketing. MR. H. V. WAITE, Assistant Sales Manager, becomes Manager, Special Trades.

Obituary

Dr. G. E. Foxwell

DR. GEOFFREY EDWIN FOXWELL, C.B.E., died at his home in Ashstead, Surrey, on Friday. Born in 1892, he was a founder the Institute of Fuel. He was elected a Fellow in 1928 and was President for two years from October, 1951. He was appointed C.B.E. in 1951. In 1912 Dr. Foxwell joined the Koppers Coke Oven and Bye - product Co., Ltd., of Sheffield, and in 1916 the Alloa Coal Co., Ltd. In 1924 he became Senior Research Chemist of the Gas Light and Coke Company Limited on the formation of the Research Department. A year later he returned to Sheffield to Koppers as Chief Technical Officer. Though retained as consultant he finally left this company in 1932, and since 1933 was closely associated on the business side with Clayton, Son, and Co., Ltd., of Leeds. From 1916 to 1924 he took successively the B.SC., M.SC., and D.SC. degrees of London University. His doctorate thesis on the Plastic State of Coal has become part of the classical literature of the science of fuel technology. He was a member of the Fuel Efficiency Committee of the then Ministry of Fuel and Power, and of its Education Committee during the late war. He also served on Sir Hugh Beaver's Committee on Air Pollution. He was editor and largely author of *The Efficient Use of Fuel*, first published in 1944 by H.M.S.O. Appointed Consultant Editor of *Coke and Gas* in June, 1939, Dr. Foxwell became its Editor in August, 1947. He married in 1916 Marion, daughter of John Richard Lowe, of Sheffield. The funeral takes place today at South London Crematorium, Streatham Vale, at 11.30 a.m.

MR. J. R. W. ALEXANDER, Executive Chairman of the Gas Officers Guild, writes:—

It would have been difficult to find a more modest man than Geoffrey Foxwell, or one of whom it could truly be said that he was without an enemy, despite his forthright achievements which were sometimes in controversial spheres. His passing—following an attack of coronary thrombosis, from which he appeared to be recovering—deprives many of one of the most able men of his generation and of a sterling friend.

He made an outstanding contribution to the Gas Officers Guild as Secretary and Treasurer from its earliest days. The advice he gave was always sagacious, practical and free of ambiguity. Senior gas officers owe much to him, collectively and individually, and he will be difficult to replace. Being an authoritative fuel technologist, he suffered not from the inhibitions of the lawyer or secretary, which rendered his services all the more useful and effective.

Good humour and wit characterised his work; his output was as considerable as it was diverse. But he had to be spared writing the current annual report of the Guild. This, however, did not prevent his intimating—in the last conversation I had with him on the day before his death—that he was 'allowed the relaxation of dealing with the proofs,' in which capacity he struck out the Council's kindly reference to his illness and to his appointment as a Commander of the Order of the British Empire.

Such was the man we mourn. He rejoiced in a happy and united wife and family and such they will remain. Playing cricket was his relaxation. He wielded a straight bat throughout life and justly may we say, at the conclusion of his innings, 'well played, sir.'

Diary

May 2-3.—WALES AND MON. SECTION, I.G.E.: Spring meeting at Tenby.

May 3.—NORTH OF ENGLAND SECTION, I.G.E.: Saltburn. 6th annual general meeting.

May 3. — LONDON AND SOUTHERN JUNIORS: Meyerstein Theatre, Westminster Hospital School of Medicine, Horseferry Road, S.W.1. Short Paper Meeting. 6.30 p.m.

May 7.—EAST MIDLANDS G.C.C.: Nottingham Chamber of Commerce, Smith Row, Nottingham. 11.30 a.m.

May 3.—YORKSHIRE JUNIORS: Visit to works of the Consett Iron Co. Ltd., Consett, Co. Durham.

May 8-9,—IRISH GAS ASSOCIATION: Talbot Hotel, Wexford. Annual general meeting.

May 8.—SOUTH WESTERN SECTION, I.G.E.: Gloucester. Paper on New Plant installed at Gloucester by L. P. Ingram. Preceded by visit to Gloucester Manufacturing Station.

May 9-11.—SCOTTISH WESTERN JUNIORS: Visit to the Stanton Ironworks Co., Ltd., Nottingham.

May 11.—MANCHESTER JUNIORS: Visit to Lostock Hall works, Preston. 'Notes from a Civil Engineer's Diary,' Mr. B. M. Evans.

May 14-17.—THE INSTITUTION OF GAS ENGINEERS: 94th annual general meeting, Institution of Civil Engineers, Great George Street, London, S.W.1.

Stock-in-the-summer Incentive Scheme is Given One Year's Trial

GAS COKE PRICE CUT BY UP TO 15s. A TON

REDUCTIONS in the price of gas coke of up to 15s. a ton came into force in most parts of England on Monday. These are intended to encourage consumers to stock coke during the summer months.

In the areas covered by the North Western, North Eastern, East Midlands and West Midlands Gas Boards, the reduction is 10s. a ton, and will remain in operation until the end of September, when winter prices, which will be 5s. a ton above the basic price, will come into operation.

South of England

In the South of England, that is, in the areas covered by the Eastern, North Thames, South Eastern, Southern and South Western Gas Boards, the reduction is 15s. a ton until June 8, when the reduction will become 8s. 4d. a ton until August 31. The basic price will be in operation for the period September 1 to November 30, and winter prices, which will be 6s. 8d. a ton above the basic price, will come into operation on December 1.

These special summer/winter prices are being introduced for a trial period of one year. They do not affect consumers in the areas of the Northern, Scottish and Wales Gas Boards.

On Monday delivered prices for gas coke in all areas were reduced by an additional 6d. a ton to take account of the reduction in the price of motor fuels.

Small Quantities

In the South of England only, because of higher distribution costs on small quantities, delivered prices for gas coke in quantities of less than 10 cwt. were increased by 1d. a cwt., also from the same date.

Schedule of Reductions

NORTH WESTERN, NORTH EASTERN, EAST MIDLANDS, AND WEST MIDLANDS AREA GAS BOARDS

April 29–September 29, 1957 ..	Reduction of 10s. a ton on basic price
From September 30, 1957	Increase of 5s. a ton on basic price

EASTERN, NORTH THAMES, SOUTH EASTERN, SOUTHERN, AND SOUTH WESTERN AREA GAS BOARDS

April 29–June 8, 1957	Reduction of 15s. a ton on basic price
June 9–August 31, 1957	Reduction of 8s. 4d. a ton on basic price
September 1–November 30, 1957 ..	Basic price in operation
From December 1, 1957	Increase of 6s. 8d. a ton on basic price

Harrogate: Emphasis Laid on the Need for Successful Training and Organisation

COUNCIL SALES MANUAL DOWN FOR DISCUSSION

THE need for training and organisation in salesmanship will be the keynote to be stressed at the Gas Council's fifth Sales and Service Conference to be held at Harrogate from Tuesday, October 1, to Thursday, October 3, 1957. The subjects of the two main business sessions of the conference will be 'Organising for sales success' and 'The Gas Council Sales Training Manual.'

The chief speakers at the latter session will be Mr. Charles E. Knights, Director of Intensive Sales Education and author of the Sales Training Manual, and Mr. Alex Anson, Sales and Advertising Director of the Granada TV network.

At the first business session, the subject of 'Organising for sales success' will be introduced by the Chairman of the Southern Gas Board, Mr. C. Harold Leach. This session follows immediately after the official opening of the conference at which the Chair will be taken by Sir Harold Smith, Chairman of the Gas Council.

The Missing Link

Sectional meetings at the conference supplement the main sessions by introducing a variety of other topics. The industrial session will discuss 'Competition' and the home service session 'Selling to the housewife.' Other sectional meetings will be on 'Marketing and servicing—the missing link,' 'Shops as selling outlets' and 'Adventure in production and selling.'

Each of the sectional meetings (except the home service session) will be repeated on the following day, so that delegates will have an opportunity of discussing at least two of the subjects.

1,000 Delegates

On the evening of Wednesday, October 2, there will be a reception and dance in the Royal Hall, where the main conference sessions will also be held. Sectional meetings will be held at the Majestic Hotel, where conference headquarters will be sited. An exhibition of domestic gas and coke appliances and industrial gas equipment is to be staged in the annexe adjoining the Royal Hall, so that leading manufacturers may show all their latest models to the delegates. It is expected that the total number of delegates will be over 1,000.

All enquiries should be addressed to the Conference Organiser, Mr. R. J. Gregg, the Gas Council, 1, Grosvenor Place, London, S.W.1.

Supercoke Would Cost Nearly £2 More, Says Midlands Chief

SPECIAL smokeless fuels suitable for burning in the ordinary grate would probably cost Midland householders between 30s. and 40s. a ton more than normal gas coke.

This estimate was given in Birmingham, at a conference on the Clean Air Act, by Mr. W. R. Branson, Deputy Chairman of the West Midlands Gas Board.

Temporary Measure

He held out little hope that such fuels might relieve local authorities of the cost of conversion to modern coke-burning appliances. Their provision would be justified only as a temporary measure, he suggested.

If the householder used two tons a year his fuel bill would be £3 to £4 higher with special fuels than it would be with gas coke. The cost of an improved coke-burning grate would be repaid in not more than two years by savings in fuel costs.

'Other Solutions'

Mr. Branson said that to tackle one-third of the West Midland 'black' areas during the next five years would cost about £3 mill. 'Although the Exchequer will bear 40%, or about £1¼ mill. of this, local authorities can hardly be blamed for looking around for other solutions,' he added.

'But such small quantities of these special fuels as can be produced in existing gasworks are likely to cost appreciably more than normal gas coke.'

Members of the Yorkshire Junior Gas Association who visited the Huddersfield works of Brook Motors Ltd With the party are Brook Motors' Sales Director, Mr. John Bailey, and Technical Sales Manager, Mr. George H. Brook.

Specialisation the Keynote of Yorkshire Juniors President's Day

VISIT TO LARGE-SCALE INDUSTRIAL USERS

SIXTY members of the Yorkshire Junior Gas Association visited Brook Motors Limited works at Huddersfield on their President's day, April 17. Before the visit members were entertained to lunch at the George Hotel by the North Eastern Gas Board, and Mr. R. H. Anderson, the President, presented his address, in which he stressed the importance of specialisation.

Many Uses of Gas

Apart from the visitors' general interest in the production of electric motors from 1/25th to 600 h.p. many of which are supplied to the gas industry, they were able to see the extensive use of gas appliances in the factories.

These range from kitchen equipment in the canteens through many types of gas-fired furnaces for annealing, hardening and other treatments, die-casting, etc., to the small jets on every one of the hundreds of winding benches in use throughout the various motor winding departments.

Finished electric motor stators are given a dip and bake treatment to complete the insulation. They pass on a conveyor, first through a tank of varnish and then through gas-fired ovens of the camel-back type to bake the varnish.

There are many other uses for gas in the factories too numerous to mention, but some idea of the volume used can be gained from the annual consumption figures. The Brook works at Huddersfield use nearly 40 mill. cu.ft. per annum while the Barnsley works consume 7½ mill. cu.ft. per annum.

The party were received by Mr. John L. Brook, Vice-Chairman and Joint-Managing Director, and were entertained to tea after their tour.

Mr. J. Bailey, Sales Director, and Mr. G. H. Brook, Sales Manager, Brook Motors, were welcomed together with Mr. J. G. Tilley (Group Financial Manager, Huddersfield Halifax Group, N.E.G.B.). Mr. Tilley welcomed the members to Huddersfield. Mr. J. Bailey outlined the work of Brook Motors and gave something of their history since their establishment in 1904.

In his address, Mr. Anderson, commenting on the year's activities, said: 'One thing has been brought to the fore and that is the normal procedure of handing out copies of the papers to the members as they enter the meeting room is in need of review. I feel that many of those present would be prepared to take a greater part in the discussion had they had more time to digest the subject matter in advance.'

Dealing with specialisation, Mr. Anderson said that in the domestic field there was the possibility of utilising, in the larger types of semi-detached and detached dwellings, gas-fired air heating as a general background heating throughout the house and to utilise appliances burning either gas or coke as a topping up medium for those rooms which were being occupied.

He went on: 'The use of gas in commercial premises is meeting just as much electrical competition as that in the domestic field and, here again, the use of gas-fired ducted warm air systems can hold for us loads that are perilously held by gas fire and radiator systems. Indeed, I feel the adoption of such systems can extend our sales quite considerably. We have, with this type of unit, the scope to give a service that we could not meet in the past as such units can be utilised during the summer months to effect a degree of cooling. A further advantage of such units is that it is possible to maintain the building under slight positive pressures and, thereby, prevent the ingress of dust laden air with a consequent saving on the decoration costs.'

Development of Plant

On the production side of the industry, more specialists would be needed to cope with the development of new type of carbonising and gas manufacturing plants.

After remarking on the industrial use of gas, Mr. Anderson said he felt sure that it was necessary for our technical staff to specialise to a greater extent.

MIDLAND JUNIORS HAVE EVENTFUL DAY

PRESIDENT'S Day of the Midland Junior Gas Association, on April 11, comprised a visit to Foleshill Road gasworks, Coventry, lunch at the Chesford Grange Hotel, Kenilworth, and a visit to Jaguar Cars Limited.

Lunch was at the invitation of the East and West Midlands Gas Boards, and among those present were Mr. G. le B. Diamond, Chairman of the West Midlands Board, Mr. T. Mervyn Jones, Chairman of the Wales Gas Board, Mr. R. F. Hayman, Industrial Gas Officer, Gas Council, Mr. J. C. Ingram, Secretary, W. M. G. B., and Mr. J. Silver, Production Director to Jaguar Cars Limited.

Mr. J. A. W. Stretton, President of the Association, who was proposing the toast of the guests, said the pattern of industrial gas in Britain was perhaps typified by the enormous loads—about twice the national average—which had been secured in the areas of the East and West Midlands.

Mr. G. le B. Diamond and Mr. Mervyn Jones both addressed the gathering.

I. o. F. Entertains Guest From Ministry

FOLLOWING its annual corporate meeting, the Institute of Fuel held its annual luncheon in London on April 25, under the Presidency of Mr. J. R. Rylands. There was a very large gathering of distinguished members and guests, of whom the principal guest was Sir John Maud (Permanent Secretary, Ministry of Power).

Guided Destinies

The President, proposing 'the guests,' said, in thanking Sir John Maud for his presence, that as Permanent Secretary of the Ministry of Power Sir John guided the destinies of the world of technology to a greater extent than was generally realised; and he did so in a way which should appeal particularly to fuel technologists—on a basis of broad, informed common sense. He brought great ability and long and rich experience to his heavy responsibilities. The members of the Institute saluted him and all their guests.

Sir John Maud, in his response to the toast, said could any of us believe that coal, which had provided the world, half way through the present century, with 57% of its total energy, could increase its total contribution to meet an estimated consumption of energy of 7½ mill. tons by 1980? He anticipated the answer would be 'No.' And so it was a splendid and thankworthy circumstance that nuclear power should have come as a supplement to coal and oil and natural gas and water power to meet the needs of the world, and particularly the needs of this country.

As well as the hopes and prospects, went on Sir John, there were great problems lying at the door. This was a great moment for fuel technologists. The world awaited the lead from Britain to make a new pattern of fuel technology, to bring in this new world of nuclear power, not to repress, but to supplement the old fuels, to enable the coal, oil and other industries concerned with fuels to meet the demands of the next 50 years for ever-increasing energy.

NEWRY UNDERTAKING FREIGHT ULTIMATUM

Newry (Co. Down) Urban Council has decided to inform all merchants supplying coal to the gas undertaking that any time they were unable to bring in a cargo at the low freightage rate the committee would be unable to accept the cargo, and the merchant next on the rota would be asked to supply it.

Mr. M. Maguire (Secretary) said if the undertaking was able to get all supplies at the low-freightage rate it would mean a saving of up to £600 per year.

£10-45 a Year Rise for Gas Staff

Employees from Today

INCREASES of between £10 and £45 a year have been granted for employees on the staff side of the gas industry, it was announced by the National Joint Council for Gas Staffs last week. The increases are effective from May 1.

Ways in which the gas industry contributes to health and welfare are portrayed on the Gas Council's stand at the exhibition held in conjunction with the Royal Society of Health Congress, Folkestone, until May 3.

The Stanton Ironworks Co., Ltd., has secured an order from the Government of Venezuela for about $1 mill. of spun iron pipes for extensions to the Caracas water system.

Gas sent out by the North Western Gas Board in March (five weeks) was 39,800,000 therms and was 7.5% less than in March last year.

In Brief

Ilkley Council is to inform the North Eastern Gas Board that if the new terms for providing gas mains and services to new domestic property are not regarded as economical, it will have no alternative but to consider making no provision for the supply of gas to new houses.

Edinburgh's Medical Officer of Health and the chief sanitary inspector have been asked to report further on the possibilities of establishing a smoke control area in the centre of the city.

ENTENTE CORDIALE: TWO MORE BOARDS LEND A HAND

THE North Western Gas Board made a special feature of French Fortnight; three of the 13 cities chosen for displays of French merchandise—Chester, Manchester and Liverpool—were in their area, and showrooms and the Board's demonstration theatres there and at Altrincham and Wilmslow were filled to capacity for wine and cheeses tasting and demonstrations of cooking.

French Week in Newcastle: Cafe scene in a showroom, with delegation from Nancy inspecting food

At Newcastle, where the Tyneside Division of the Northern Board co-operated in publicising French Week, the four main showroom windows in Grainger Street were specially treated.

A collection of artistic, historic and manufactured articles from the French town of Nancy were displayed. During the week a delegation from the town were welcomed by Newcastle dignitaries who were received by the Chairman of the Board, Mr. E. Crowther.

The Mayor and Mayoress of Chester are welcomed to the North Western Gas Board's showrooms during French Fortnight by Mr. Harry Butters, Board Member. Others on the group include (second from left): Mr. T. Lionel Jones, District Service Manager; (second from right): Mr. J. G. Godwin, Sales and Service Officer, Wirral Group, and (extreme right): Mr. A. H. Williams, formerly of the showroom staff at Chester.

ATOMIC POWER FOR GAS MAKING?

USE of nuclear power in gas-making was foreseen by Sir Henry Jones, Deputy Chairman of the Gas Council, when he spoke on April 26 at the dinner in London of the Junior Institution of Engineers.

'The gas industry,' he said, 'has grown up on a diet of carbonisation coal. Now this kind of coal is expensive and becoming scarce, so that the industry is developing new processes of gas manufacture which can use oil or low-grade coal.

'Some of these processes involve gasification at pressures of about 20 or 30 atmospheres and a fascinating field of development lies ahead.

'Possibly, as higher temperatures become available, the nuclear furnace will find an application to gas-making.'

Sir Henry was proposing the toast to the Institution.

Manchester Juniors Pay Visit to Some Familiar Friends

SIXTY members of the Manchester District Junior Association of Gas Engineers were the guests of Meters, Ltd., Oldham, for their meeting on April 25.

They were welcomed at luncheon in the Union Club by Mr. J. P. Smith, Director and General Manager of J. and J. Braddock, who expressed regret at the absence of Mr. G. Barlow, Managing Director, who had suffered a bereavement the previous day, but hoped to join the visitors when they toured the works later.

Comprehensive Paper

Seated with Mr. Smith at the head table were Mr. W. Buckley, Works Manager; Mr. J. K. Findlay, Sales Manager of Meters, Ltd.; Mr. Percy Davies, Sales Manager for the North West area; Mr. T. Nicklin, President of the Association; Mr. H. Partington, Immediate Past-President; Mr. J. K. Lord, Senior Vice-President; and Mr. N. Hare, Assistant Production Engineer, North West Gas Board, who later submitted a comprehensive paper on 'Alignment charts and graphical aids for use in the control of production processes.'

Mr. Smith said his earliest recollection of his association with the Manchester District Juniors was an invitation to visit the same works 30 years ago. He had no idea at that time that he would be in his present position at Braddock's and extending a welcome to the Association.

Mr. Smith then proposed a toast to the President and the Association. This was reciprocated in a toast to the Company, submitted by Mr. Nicklin.

Oldest Undertaking

Introduced by Mr. Nicklin as 'our General Manager, Mr. Bill Harrison,' Mr. Harrison said gas meters had been manufactured in Oldham since 1830. He was pleased to join the Association on the occasion of their visit to the oldest undertaking in the country.

Talking to apprentices on the gas stand at the opening of a Cardiff careers' exhibition recently is Mr. T. Mervyn Jones, Chairman of the Wales Gas Board. The apprentices gave demonstrations and on another stand home service advisers showed their skill at cooking.

Royston Enters New Phase In Its History

LINK-UP WITH CAMBRIDGE AFTER 120 YEARS' SERVICE

AN unfailing supply of gas for more than 120 years; a reputation for courtesy and promptitude with individual attention for every customer, such is the record of the Royston (Herts) gas undertaking which is now entering a new phase in its long history.

The retorts stand cold and silent at the Mill Road works, which on March 30 was closed as a manufacturing unit. Supplies are now pumped from the Cambridge works through the 15 miles of cast iron mains which now connect Cambridge with Royston.

To trace the progress of the undertaking at Royston since it commenced operations in 1836, is to discover a story of enterprise and faith.

Steady Progress

The enterprise made steady, if unspectacular, progress until in 1860 the Royston Gas Coal and Coke Company was incorporated with a capital of £3,500. In that year, 10 mill. cu.ft. of gas was made, which increased to 15 mill. by 1910. Last year the output was 41 mill.

A vigorous publicity campaign, conducted during 1924, resulted in consumption jumping by 1,300,000 cu.ft. Consumers had increased by 200.

During the second world war the annual output of gas rose to 19 mill. cu.ft. in 1941. At this most difficult period (1941), the Company met another serious setback in the resignation of the Engineer and Manager, Mr. Staley, whose health did not permit him to continue, and Mr. R. J. Gavin stepped into the breach. In the first year he had the satisfaction of witnessing the successful debut of the producer gas plant, followed by the erection of the benzole plant.

Large Demands

During the eight years since the industry passed into public ownership, gas for domestic, industrial and commercial use in Royston has steadily increased. Originally the scheme for integrating gas supplies provided for the Royston-Cambridge link to be commenced later, but the large demands of the Johnson Mathey factory made it imperative that adequate supplies of gas should be available in readiness when operations commence this year. Consequently the first steps were taken in August, 1956, and thanks to good weather excellent progress was made and the connection between Royston and Cambridge realised in March this year.

Mr. Gavin will continue as District Manager.

The Chairman's Address to the Manchester and District Section, I.G.E., on April 26, 1957

Retrospect and Prospect in the Gas Industry

—*With Particular Reference to the South Lancs. Group of the North Western Gas Board*

By R. L. GREAVES, M.B.E., M.Inst.Gas E.,

GROUP GENERAL MANAGER, SOUTH LANCASHIRE GROUP, NORTH WESTERN GAS BOARD.

THOSE who intimately know the history of the gas industry readily concede that it has been resourceful, successful and progressive; those who are most competent to judge its future prospects believe that still greater achievements and service lie ahead and that these may well be speeded by revolutionary changes.

With this in mind, in this address I shall describe some aspects of the South Lancashire Group of the North Western Gas Board and then seek to show it in relation to the broader pattern of the industry.

In former days when one described one's gas undertaking it was one of over 1,000. Today if an address describes a Board it describes one of 12 in Great Britain. The North Western Gas Board comprises 13.7% of the total industry. If one describes a Group or Division (these terms can be misleading and are often synonymous) one describes an important area within a board.

The South Lancashire Group comprises 11.5% of the Board in terms of gas made. The growth of gas sales is shown in Table I and Graphs I and II. The calorific value supplied is 450 B.Th.U. per cu.ft.

TABLE I

SOUTH LANCASHIRE GROUP
TOTAL GAS SOLD—EXCLUDING BULK SALES TO OTHER GROUPS

Year	Cubic Feet (millions)	Therms (thousands)	Increase and decrease over previous year	Increase since 1950-51
1950-51	7,088	31,896		
1951-52	7,357	33,108	+3·80%	3·80%
1952-53	7,329	32,984	−0·37%	3·41%
1953-54	7,753	34,885	+5·76%	9·38%
1954-55	8,380	37,715	+8·11%	18·24%
1955-56	8,587	38,646	+2·47%	21·16%

The Group produced 9,630 mill. cu.ft. of gas in 1955-56 and sold in its own area 8,587 mill. cu.ft.; it also sold 250,000 tons of coke; it covers 201 sq. miles (see map Appendix I) and includes:—

	Population		Population
3 *County Boroughs*:			
St. Helens	111,900	Hindley	19,330
Wigan	84,620	Ince-in-Makerfield	20,400
Warrington	80,250	Lymm	6,441
		Newton-le-Willows	21,530
1 *Municipal Borough*:		Orrell	9,412
Widnes	48,860	Rainford	4,126
		Standish with Langtree	8,947
15 *Urban District Councils*:		Up Holland	6,139
Ashton-in-Makerfield	19,053	Bold	2 226
Aspull	6,522		
Abram	6,205	4 *Rural District Councils*:	
Billinge with Winstanley	6,054	Whiston (Part)	4,350
Golborne (including Lowton)	17,000	Runcorn (Part)	7,500
Haydock	12,030	Warrington Rural	23,410
		Wigan Rural	8,153

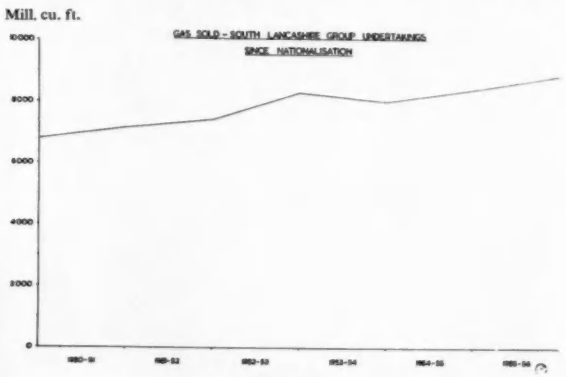
Total population: approximately 500,000.

Within this area is a great concentration of industry. Development is continuous and I feel it will be interesting and serve a useful purpose to describe some of the industrial highlights of the area. It is against the geographic and industrial background that the prospect of the local gas industry can best be understood and the potentialities assessed.

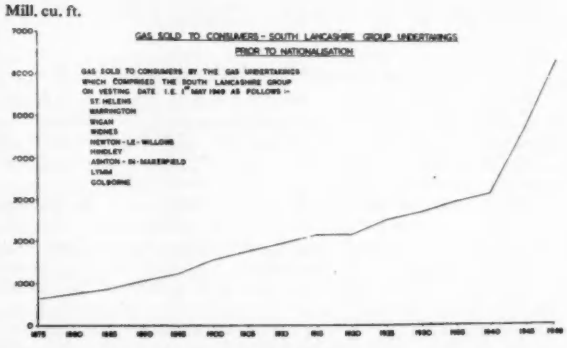
Recently I prepared an A.B.C. of Industry in the South Lancs. Group to show that the list of industries using gas is extremely extensive; the products ranged right through the alphabet from aspirins to zinc. (See Appendix II.) In the fiscal year 1955-56, 4,207 mill. cu.ft. of gas were sold to industry, or 48.9% of total sales. This unusually high industrial percentage is largely due to the popularity of town gas for certain processes, in the glass industry at St. Helens and the wire industry at Warrington, but all industries using heat in the group are becoming increasingly aware of the economy and efficiency of gas in their processes.

Even the smaller towns in the Group have large industrial gas consumers, Newton-le-Willows has a large diesel loco works, railway repair depôt and large gas oven builder, Hindley has an asbestos works and paint and varnish works, Golborne has a nut processing works, and Ashton-in-Makerfield three works producing locks and hinges. A new glass works is being erected at Abram and gas has been connected. Wigan, a larger town (mainly a coal and cotton centre), uses gas for ordnance, engineering and foundry works and there a vast new food processing factory costing £7 mill. is to take 274 mill. cu.ft. a year.

At Culcheth, near Warrington, the Atomic Energy Authority has established itself and this area appears to be developing into a new town. Gas has been taken to the area. The



Graph I



Graph II

Atomic Energy Authority here have administration of maintenance and repair for the whole country, and laboratories have also been built for applied research as distinct from pure research as at Harwell.

Wire and Wire Products

In 1950, at Warrington, where 5,800 wireworkers are employed, a director told of an ideal new plant for the production of wire nails, which had been laid out so as to be operated from a management standpoint. This plant is perhaps the finest of its type in the world and I quote it as one example of the place Warrington holds not only in the wire industry but in many industries. Every year important advances are made and gas usually plays some part. Also at Warrington a firm producing detergents, glycerine, silicates, animal food and the like has recently announced a £5 mill. plant extension.

Burtonwood Air Base

In 1955 it was reported that the United States Government expenditure at the Burtonwood American air base, in the fiscal year ending June alone, exceeded £10 mill. This vast base between Warrington and St. Helens is rapidly becoming aware of the value of town gas and the whole-house warming unit is being extensively used as well as a good range of domestic gas appliances in new married quarters. Gas consumptions in many of these houses reach well over 1,200 therms per annum.

The New Widnes/Runcorn Bridge

The new Widnes/Runcorn Bridge is an important factor in the future of the Widnes chemical and industrial area and the opening up of this important route to speedy traffic will doubtless have far-reaching development results. A new gas main is planned over the new bridge which opens up possibilities of new and improved gas supplies for town gas and possibly a new route for refinery gas.

St. Helens Glass Works

In 1954 a glass works' director said of St. Helens County Borough: 'St. Helens can look with pride on its record of industrial achievement. It is unique in this country in the concentration and tremendous range of its glass making activities, and in this respect I know of no town in the world that can match it. Nearly 17,000 people are now employed in glass making in this town, but as with the nation, so with its towns; all are involved in the struggle for higher productive efficiencies and the glass industry depends greatly on the products and service of others.'

Ten Large Glass Works

The Heavy Glass Industry at St. Helens		Principal Products
Pilkington glass works ..	Sheet glass works	Sheet glass
Associated companies ..	Cowley Hill works	Plate glass
	Ravenhead glass works.	Cathode ray tubes Pressed ware Glass bricks
	Fibreglass works	Fibreglass
	Triplex Ltd.	Toughened glass for motor vehicles screens
	Chance Bros.	Optical glass
	City Road works	Mirrors Double-glazed units Decorative glass Armour plate glass
Glass bottle and container industry at St. Helens	Sherdley works	Bottles and containers
United Glass Bottle Manufacturers.	Ravenhead works	,, ,,
Forsters Glass Company ..	Atlas works	,, ,,

There are also three smaller glass works which have turned over to gas for glass bending and glass tube manufacture.

Total Gas Sales to the Glass Industry and New Mains

The outstanding progress of town gas in the glass industry is illustrated by comparing the sales to that industry at St. Helens in 1937 of 350 mill. cu.ft. with those in 1956 of 2,250 mill. cu.ft. Pilkington Brothers' glass manufacturers' group exported in 1955 1.5% of the total dollar exports of Great Britain to Canada and U.S.A. The South Lancashire Group is proud to have assisted in this achievement by supplying to the Pilkington group of glass works nearly 1,000 mill. cu.ft. of town gas in that year.

Recently a 36-in. gas main has been laid from St. Helens holder station (Pocket Nook) to the Cowley Hill glass works and surrounding district in order to meet growth and new loads; an 18-in. main has been laid from the Eccleston district gasholder to the new Triplex glass works and district; an 18-in. main has been laid from Eccleston district holder to the Fibreglass works and district.

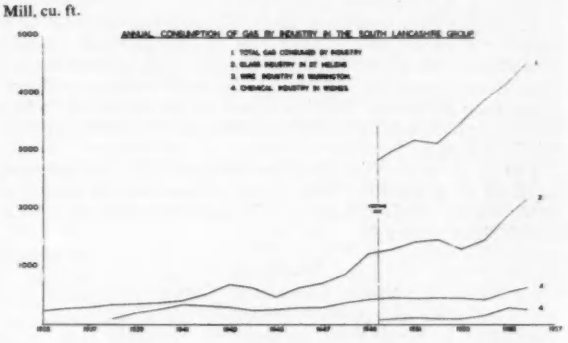
Appropriate capital contributions to these and other mains have been made and the vastness of the development is best indicated by recording the facts. The installations are an earnest of the confidence the firms have in town gas for the future based upon 20 years' past experience. During those 20 years I have had the privilege of installing at 10 St. Helens' glassworks 17 duplicate sets of gas boosters, which boost gas continuously, 24 hours a day, seven days a week, into these factories, giving each factory its own control of outlet gas pressure.

This system has saved distribution capital and given operational satisfaction to the consumers. Low-pressure cut-offs are fitted to the boosters but they are merely safety devices, as inlet pressures are consistently maintained at nearly double the statutory pressure.

New glass loads connected since November 1, 1956, include:–

	Town Gas	
Replacement of producer gas from anthracite	10,000 cu. ft. per hour	Or 365 mill. cu. ft. a year.
Safety glass production	25,000 ,, ,,	
Plate glass production	10,000 ,, ,,	

Graph No. III shows the overall growth of gas usage in the glass industry of South Lancashire. It also shows the total industrial load growth and the growth in the wire industry at Warrington and the chemical industries at Widnes.



Graph III

The industrial gas load at Warrington is 580 mill. cu.ft. a year. The chemical industry at Widnes produces some of its own heat and town gas has not made the same progress in its processes. Nevertheless, present prospects are good.

Cost of Heat

Heat costs expressed as a percentage of total production costs are about from 20% to 30% for glass, 15% for ceramics, 2% for wire heat treatment, 1% for wire galvanising and 2% for baking.

Industrial Load Growth

The growth of the industrial load in the Group showed 41% increase in 1955-56 over the load in 1950-51 (Table II). Such an increase may be classed as notable, but I believe this is only indicative of the future possibilities in industrial areas.

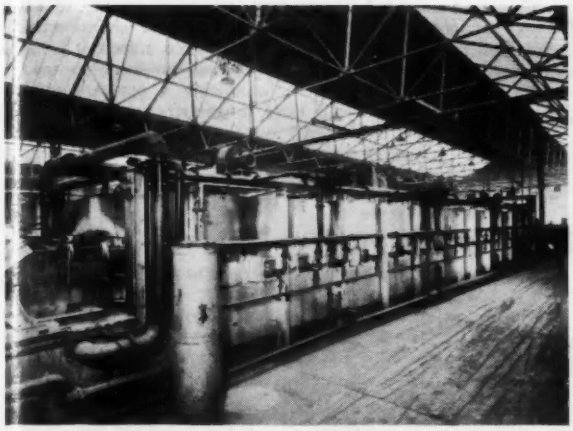
TABLE II

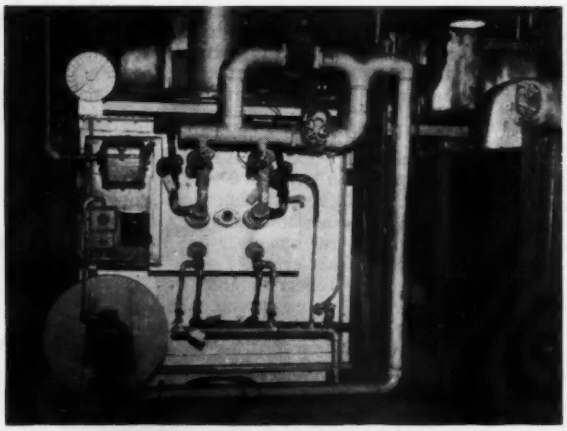
South Lancashire Group

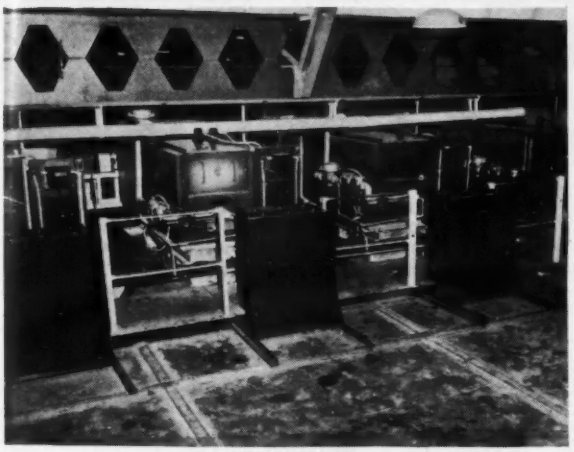
INDUSTRIAL GAS SOLD TO CONSUMERS

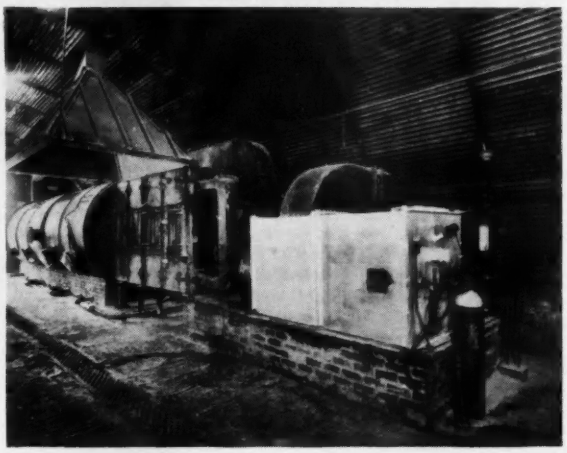
Year	Therms	Average Net Income		Industrial sales percentage of total sales per annum
		Net income per therm d.	Increased income per therm since 1950-51	
1950-51	13,431,417	8·82	—	42·1%
1951-52	14,448,874	9·00	2·02%	43·6%
1952-53	14,161,492	10·30	16·78%	42·9%
1953-54	15,782,607	11·25	27·55%	45·2%
1954-55	17,978,566	11·14	26·30%	47·7%
1955-56	18,935,295	11·97	35·71%	48·9%

Increase 1955-56 over 1950-51 = 40·9%









Top left: *One of five existing and proposed wire patenting and tempering gas-fired furnaces at the Whitecross Company wire works, Warrington. Consumption 6,000 cu.ft. per hour, temperature up to 1,000°C.*

Top right: *Heater box for gas-fired wire galvanising bath by Incandescent Heat Company. Indirectly heated by recirculated hot air. Working temperature 470°C. Maximum gas consumption 3,000 cu.ft. per hour (plus 5,000 cu.ft. per hour for associated lead bath in line).*

Centre left: *Close up of gas fired heater boxes on top of fibreglass rigid-section curing ovens. (Fibreglass works, St. Helens.)*

Centre right: *Gas fired chemical sublimer with re-circulation. (W. J. Bush Ltd., Widnes.) Consumption 500 cu.ft. per hour, working temperature 160°C. Comprising heater box, tray oven and condensing chamber. Material explosive.*

Bottom left: *Lifting a 12,000 cu.ft. per hour B.M. meter into position for Watts & Company, gum works, St. Helens.*

Bottom right: *Gas fired overhead heaters—factory heating. (Cecil Roberts, engineers, Warrington.) Consumption 50 cu.ft. per hour. Floor area covered per heater is 300 sq. ft.*

C

The manufacture of gas so near to such large new industrial loads as are potentially available is a position to be exploited as far as possible locally, and Warrington gasworks with plenty of land is so strategically placed that it may well be one of the most important gasmaking sites of the future.

Proximity to Coalfields

The Group's three large works are in close proximity to good quality Lancashire coals, no less than 27 out of the 62 collieries of the Lancashire coalfield being within the Group area. The 27 pits employ 21,000 mineworkers. The Group carbonises 500,000 tons of coal per year out of 27 mill. tons used by the gas industry, *i.e.*—one ton in every 54.

The collieries in the St. Helens area lead in the output produced by power loading equipment. This is due to the success achieved by the installation of the Anderton Shearer loader on many of the coal faces at the collieries. The shafts at Bold colliery, St. Helens, were sunk about 1880 and deepened in 1906 and 1940. Coal has been worked without cessation from the completion of the sinking in 1880.

Since vesting date of the Coal Industry Nationalisation Act, 1946, this colliery has been modernised to become one of the most modern in the country and one of Lancashire's most important coal producing units, and the annual output is approaching 1 mill. tons. It has been stated that there are coal reserves of approximately 65 mill. tons in seams running to the south towards Burtonwood, Sankey and Penketh.

Both the surface and underground are spacious, the surface being laid out with lawns and gardens. Underground the roads are well lighted and there are battery locomotives for hauling the mine cars and cars for manriding. Anderton Shearer loaders with teams of men varying from 30 to 50 keep the conveyor belts running to capacity. Coal feeds direct to the £17 mill. electric power station situated next to the pit.

Estates of hundreds of Coal Board houses have been equipped with gas appliances for the use of the colliers. On the Haydock housing estates, largely tenanted by colliers, the gas cooker is installed in practically every house.

Methane Extraction

At Sutton Manor colliery, St. Helens, and at many other collieries, methane drainage is being practised. Holes are drilled over the coal and drain the gas from the superincumbent strata. At Sutton Manor colliery, a pit which has been modernised, the gas is brought to the surface approximately two miles from the working faces through a 9 in. pipe. An extractor plant has been installed on the surface and the gas is now being used for firing a boiler.

Since vesting date, the National Coal Board has spent over £500,000 on borings, and proving the unworked coalfield.

It has been found from the borings that in an area at Newton-le-Willows, Winwick and Croft, there are reserves of approximately 150 mill. tons of coal.

A new colliery is being constructed at Newton-le-Willows costing about £12,000,000, to be known as Parkside colliery. The colliery should employ about 2,200 men when in full production and it is of interest that this will be the first colliery to be constructed in Lancashire for many years. It would be in the national interest for all this coal to be carbonised. Methane gas is also in use for firing boilers at the disused Old Boston colliery, Haydock. After a fire, which made the working of the colliery impracticable, pipes were laid in the shafts and the shaft sealed. Gas drained from the workings under natural pressure and brought to the surface through the pipes is used for firing a boiler for space heating.

The gas industry can help to clean up South Lancashire's industrially smoke-laden skies; and any surplus methane from the pits can be put to that use by the gas industry. The colliery chimneys themselves in the past have been among the worst offenders for producing dense black smoke, and it is good to know that the deadly fire-damp is being put to good use and is cleaning up the colliery chimneys while saving coal.

Coal Quality and Price

The present qualities and types of coal received are set out in appendix III, also the present delivered price. These coals are allocated to the three works in a manner to bring the number of qualities carbonised at each works as near to unity as possible. The plants concerned are all continuous vertical retorts.

The ideal would be to receive one coal quality at each works of constant and the most suitable characteristics. Although the C.V.R. plants are very flexible indeed, it is more economic to maintain ideal and constant conditions based on constant quality coal, thereby producing a constant quality coke. My production staff have sought strenuously to establish this position and aided by the Board's Coal Officer, have come far nearer to this ideal than might have appeared possible in these times of alleged shortage of suitable qualities in suitable quantities.

South Lancs. Gas Grid

The Group's three large gasworks are at St. Helens, Warrington and Wigan.

The following works have been shut down: Lymm, Ashton-in-Makerfield, Hindley, Newton-le-Willows and Widnes. Golborne works was shut down before nationalisation. The nine undertakings are now interlinked with grid gas mains as follows:—

St. Helens via Newton to Warrington.	24 in. and 18 in. diameter high pressure.	12 miles
St. Helens to Widnes	18 in. and 15 in. diameter ,,	7 miles.
St. Helens to Wigan	12 in. and 10 in. diameter ,,	9 miles.
Wigan to Hindley	10 in. diameter high pressure	2 miles.
St. Helens, Ashton and Golborne..	10 in. diameter ,,	7 miles.
Lymm has been connected to Partington Manchester Group by ..	8 in. diameter medium pressure	7 miles

Advantageous Mainlaying Routes

In addition the South Lancashire Group is connected to Manchester Group, Partington works, by a 24 in. H.P. main along the East Lancashire Road and to Liverpool Group by a 10-in. H.P. main via Prescot soon to be augmented by the completion of the 24-in. H.P. main along the East Lancashire Road, an advantageous mainlaying route. Other economical routes have been found by arranging wayleaves along the convenient railway lines and canal towpaths.

This grid has allowed gas to be sold by the Group or purchased from other groups as suiting the best interest of the Board and consumers as a whole at any given time, and has allowed the nearest approach possible to base loading of plant and the economic co-ordination of repair programmes.

PRODUCTION

The future of production in the Group is being considered in the light of the best interest of the whole Board and, happily, the present position enables the future to be catered for:

(a) By extending the existing plants in South Lancs., which give low operating costs with coal available at a price somewhat lower than average;

(b) by modifying existing South Lancs. plants to new techniques developed by the Board's technicians; or

(c) by using the grid to sell surplus gas to other Groups or to buy, as desirable, gas made elsewhere.

The Continuous Vertical Retort

The continuous vertical retort has been the sole system of carbonisation in operation at St. Helens since 1907, at Warrington since 1922 and at Wigan since 1952. Horizontal retort installations at Wigan, Widnes and Hindley have been shut down as comparatively uneconomic. The latter all either had to be replaced or superseded and the Group now has only C.V.R's. with the recent addition of C.W.G. for peak loads. I submit that for the loads and conditions appertaining, no other system of gasmaking could compare on the basis of comparative costs; excellent operating conditions; reliability; flexibility and production of acceptable products, namely:

(a) Gas of consistent and reliable quality, specific gravity, wobbe index and purity;

(b) excellent coke, much sought after in the region's domestic and commercial markets, and with splendid export cargo inspection reports; and

(c) standard tar, benzole and concentrated liquor. Most important, by this system, these products are manufactured smokelessly.

The Group is in a position to compare working costs on West's Gas C.V.R.'s at St. Helens, Woodall-Duckham C.V.R.'s at Warrington, and Drakes C.V.R.'s at Wigan; it is gratifying

To implement the Clean Air Act the best National Economic Solution is still achieved by installing W-D Continuous Vertical Retorts

- *Make* ***towns gas*** *without using imported oil*
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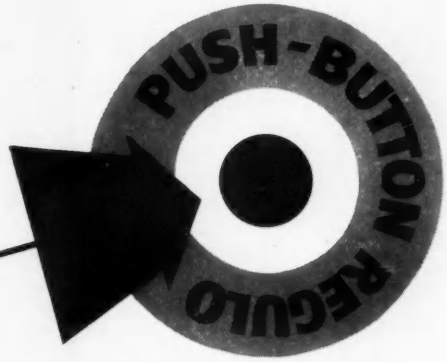

INPUT – 15,000 B.Th.U/hr
CAPACITY – 1½ gallons
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- Provides a full half-gallon of piping hot water every minute, at a farthing a gallon.
- A broken feed type heater, with all working parts totally enclosed. Designed for wall fixing, it works equally well on both hard and soft water.
- Slim, easily detachable one-piece steel case finished in sparkling, clean-at-a-wipe cream or white vitreous enamel.
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that the respective station engineers delight in competing for pride of 'high efficiency—low cost' place.

TABLE III

SOUTH LANCASHIRE GROUP

NET COST OF GAS PRODUCTION EXCLUDING CAPITAL CHARGES

	Year	St. Helens per therm made d.	Warrington per therm made d.	Wigan per therm made d.	Hindley per therm made d.	Widnes per therm made d.
		C.V.R.	C.V.R.	Horiz. R	Horiz. R	Horiz. R
	1950–1	6·08	5·55	8·23	10·07	7·69
	1951–2	5·53	5·42	8·0	11·06	7·62
	1952–3	5·29	5·92	7·89	7 mths. 10·7 shut down	8·87
	1953–4	6·50	7·22	C.V.R. & Horiz. 8·73	—	9·56
Line 38 North Western Gas Board Management Account.	1954–5	6·52	6·99	C.V.R. 8·03	—	10·50
	1955–6	7·71	7·47	8·17	—	12·52
				* Shut down July, 1956.		*

All three types of C.V.R.'s have gone from strength to strength and I am not alone in believing that no system of gas-making at present available to us can compete with the continuous vertical retort on a commercial basis. Its future is linked particularly with the use of smokeless solid fuel, amenity, and production of gas of correct characteristics from home produced fuel (coal).

In my opinion the reasonable flexibility of the system should be underlined and I cannot agree with the school of thought which suggests that C.V.R.'s are over selective in the types of coals to be carbonised. In fact experience has shown that verticals can deal with a very wide rank and range of coals indeed.

Standardisation a Factor in Achieving Low Cost

I have always believed in having only one system of carbonisation at any one works. This uniformity makes for simplification, and the policy has paid dividends. Now we have the following position:—

St. Helens .. West's Gas Improvement .. C.V.R.'s 14 mill. cu. ft. a day.
Warrington .. Woodall-Duckham .. .. C.V.R.'s 10½ ,, ,,
Wigan .. Drakes .. .. .. C.V.R.'s 6 ,, ,,

So often on works of this size, two or three systems exist. The recent addition of carburetted water gas plants, 6 mill. cu.ft. a day does, however, at reasonable capital cost, provide the means to gasify coke and oil as necessary and speedily to meet peak loads. Kept in its right proportion this process adds to flexibility, peak load advantage and economy.

Costs

So often authors in presenting papers omit convincing or acceptable reference to costs, and often the cost approach is academic. Sometimes costs are quoted without making it clear whether capital costs are included or not. Unless great care is taken comparisons will be made on misleading bases. While an academic approach is useful as a guide, nothing is so reliable as a prolonged commercial result. I trust the costs given will be of real value.

TABLE IV

SOUTH LANCASHIRE GROUP

NET COST OF GAS MADE EXCLUDING CAPITAL CHARGES

Year	Line No. 38 Board Accounts		National figure calculated from Gas Council's Report per therm d.
	Group per therm d.	Board per therm d.	
1953–54	7·36	8·43	10·27
1954–55	7·29	8·38	10·35
1955–56	8·14	9·09	10·72

TABLE V

SOUTH LANCASHIRE GROUP

NET COST OF GAS MADE INCLUDING CAPITAL CHARGES

Year	Line No. 48 Board Accounts	
	Group per therm d.	Board Average per therm d.
1953–54 ..	8·74	9·88
1954–55 ..	8·66	9·90
1955–56 ..	9·57	10·84

How important these low costs are can be realised when it is remembered that 48.9% of the total gas made is sold at bulk rates to industrial consumers as below.

The average net income per therm of the total gas sold is also shown.

TABLE VI

SOUTH LANCASHIRE GROUP

	Industrial Consumers. Gas sold by agreement. Average net income per therm		Total Gas Sold Average net income per therm	
	St. Helens d.	Group d.	St. Helens d.	Group d.
1935–36 ..	4·56		6·31	
1936–37 ..	3·94		6·10	
1937–38 ..	3·89		6·19	
1938–39 ..	3·88		6·44	
1939–40 ..	4·42		6·94	
1940–41 ..	5·42		7·79	
1941–42 ..	5·70		7·75	
1942–43 ..	6·32		8·31	
1943–44 ..	6·56		8·63	
1944–45 ..	6·91		9·23	
1945–46 ..	7·49		9·42	
1946–47 ..	7·38		9·31	
1947–48 ..	7·29		9·04	
1948–49 ..	7·36		8·95	
1949–50 ..	—	8·00		10·00
1950–51 ..	—	8·82		10·97
1951–52 ..	—	9·00		11·67
1952–53 ..	—	10·30		13·64
1953–54 ..	—	11·25		15·19
1954–55 ..	—	11·14		14·97
1955–56 ..	—	11·97		15·84

Historic Note

Here I pay tribute to a predecessor, Samuel Glover, C.E., Engineer and Manager, St. Helens, 1887-1922. Largely through his foresight and skill between 1905 and 1908 the Glover West continuous vertical retort system was born at St. Helens, coincidently with the Woodall-Duckham system at Bournemouth 1905, and Mr. Glover installed a successful demonstration plant at St. Helens in 1908.

The Manchester District members in 1909 inspected at St. Helens the working of the new continuous vertical retort system of carbonising which had been in continuous operation during the previous 17 months, at 250,000 cu.ft. per day capacity developed by Young, Glover, and West's Gas Company.

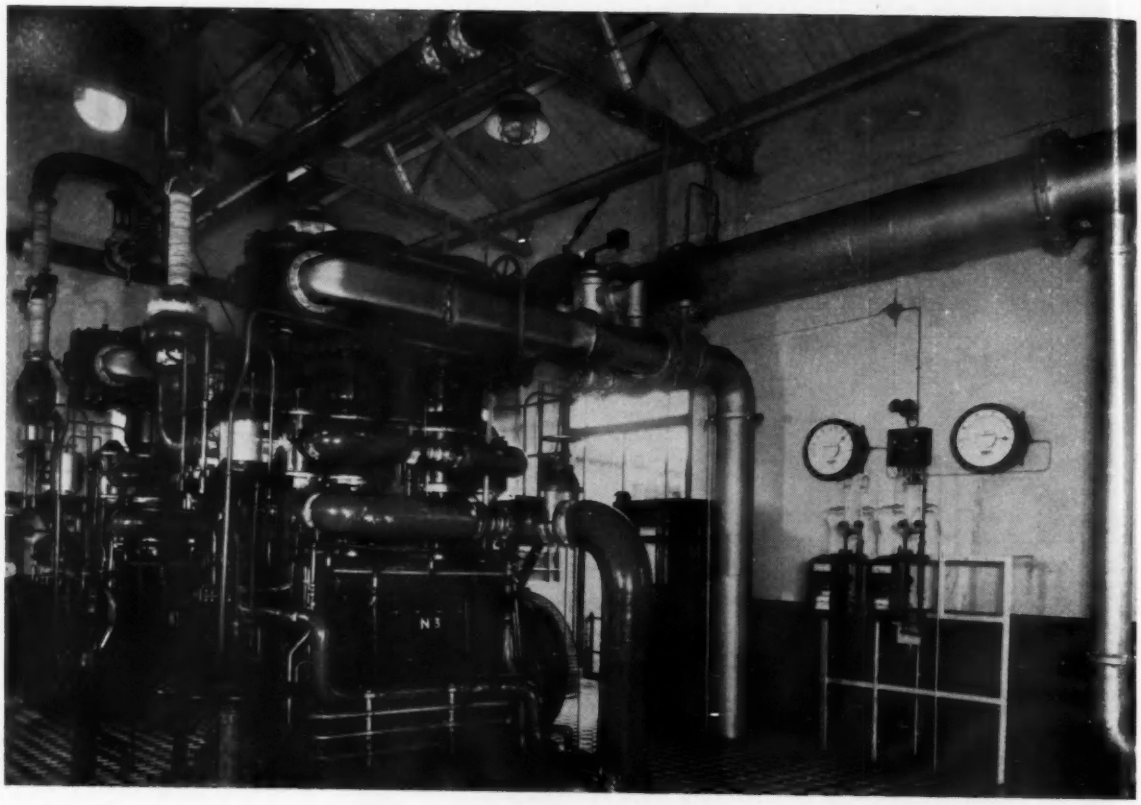
The same system at St. Helens gasworks, with improvements, had grown to 14 mill. cu.ft. a day by 1956 and produces gas at a cost which is the cheapest in the North West. An interesting point from the paper read by Mr. S. Glover on October 30, 1909, has significance today.

He said: 'We may say, from experience gained in working these retorts, that it is not advisable to admit any steam with the view of making water gas in the same retorts, and we have concluded that, should it be thought desirable to add water gas, it would be more economical to make it in a separate apparatus.'

I quote this because, in spite of this statement, in 1918 'steaming' became standard practice for continuous vertical retorts and is still practised to the full, yet there is much opinion in 1957 for reverting to making blue water gas in an external plant, and using this to dilute the higher calorific gas thus made in the unsteamed retorts.

Improvements in C.V.R. Design Top Layout

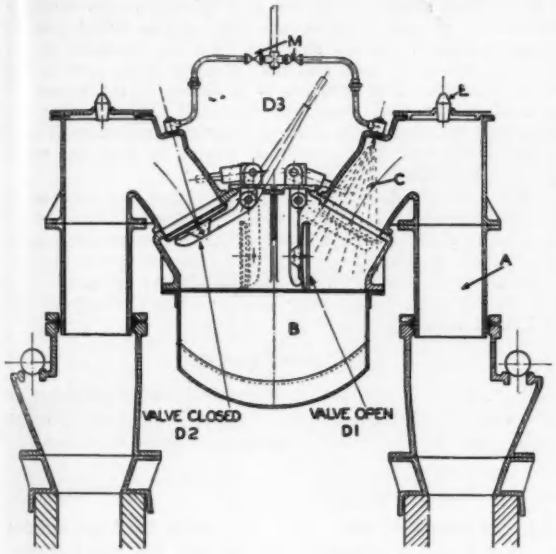
Several improvements in continuous vertical retorts took place over the years at St. Helens. In 1943 I successfully introduced in co-operation with the contractors a new top lay-



Compressors, St. Helens.

General view, top of stack, St. Helens: 1943 design.

out—Diagram 1. This greatly improved the working conditions and became the new standard. It was designed for downward augering instead of upward, but by including hot liquid circulation and sprays in fact did away with augering altogether. It reduced the size of the coal boxes and gave cool open top ironwork. It also did away with bulky overhead hydraulic mains which had many comparative disadvantages, it made less arduous and reduced the work to be done, so that the men's productivity increased. Topmen's work was in fact revolutionised. (See illustrations on page 13.)



A = Gas Offtake *B = Gas Collecting Main*
C = Hot Liquor Spray *D, and D^2 = Gas Offtake Flap Valve*
D^3 = Detachable Hand Lever *E = Plug*

In 1946 a system of fan air was applied to the step grate producers automatically controlling the CO volume and flue pressure by the latter, thus assisting to maintain constant pressure and heating at all times, including during the clinkering period. St. Helens Undertaking is proud to have contributed much to the introduction and development of the continuous vertical retort. The St. Helens table of gasmaking costs is a tribute to the system itself.

TABLE VII

SOUTH LANCASHIRE GROUP, ST. HELENS UNDERTAKING

Net Cost of Production (Excluding Capital Charges)
Cost of Coal Delivered and Handled

	Year	St. Helens per therm made d. C.V.R.	Coal Cost per ton delivered and handled
St. Helens Corporation Accounts	1938–39 ..	2·78	24s. 1d.
	1939–40 ..	2·89	25s. 2d.
	1940–41 ..	3·65	29s. 11d.
	1941–42 ..	4·05	32s. 11d.
	1942–43 ..	4·59	35s. 10d.
	1943–44 ..	4·91	37s. 0d.
	1944–45 ..	4·46	43s. 0d.
	1945–46 ..	4·71	47s. 2d.
	1946–47 ..	4·96	48s. 3d.
	1947–48 ..	5·22	50s. 10d.
	1948–49 ..	5·99	57s. 5d.
Board accounts	1949–50 ..	5·50	58s. 3d.
	1950–51 ..	6·08	59s. 2d.
	1951–52 ..	5·53	64s. 11d.
Line 38 Board management accounts.	1952–53 ..	5·29	70s. 5d.
	1953–54 ..	6·50	78s. 7d.
	1954–55 ..	6·52	79s. 0d.
	1955–56 ..	7·71	90s. 7d.
	Increase since 1938–39		
	180%	..	275%

Gasification of Oil in Continuous Vertical Retorts

During the last war it became of value to the nation to convert considerable quantities of oil to town gas, and the Ministry of Fuel and Power offered incentive to gas undertakings to achieve this. At St. Helens, with the valued assistance of the contractors, we very successfully converted several of the vertical retorts to oil gas production. I described the method and this was published in the Transactions of the Institution of Gas Engineers, 1947-48.

Briefly the method was to spray atomised oil in a vertical fountain up hot empty retorts. The oil was completely gasified and no oil whatsoever returned by gravity to the spray baseplates at the bottom of the retorts. As a result of this experience I stated that in due course gasmaking plants designed solely for the gasification of oil would be produced some time in the future when the comparative price of oil and coal made it economic.

It is interesting that in 1957 many oil gas plants are at work or going to work. Even so I believe that commercial success on pilot plants is wise before too wide an adoption of these processes takes place; and too great a dependence on imported fuel is undesirable, as recent events have emphasised.

Plant Standards and Productivity

The Group's administration prides itself on maintaining the highest standards of plant, and photographs are appended. A high standard of maintenance and cleanliness of works is also a tradition.

In 1950 the Group had 2,000 employees and made 7,100 mill. cu.ft. of gas. By December, 1956, the number of employees had dropped to 1,700 and the make of gas had increased to 9,630 mill. cu.ft. This represented 15% less employees and 26% increased production. Much of the saving in salaries and wages, which is in the order of £3,000 per week on a comparative basis, arises from the closing of the smaller and less efficient stations.

In dealing with redundancy problems, consultation took place in advance and reasonable notice of intentions was given; problems arising have been handled smoothly.

Having described some aspects of my Group especially suitable to this occasion and with the foregoing thoughts in mind I found it necessary to turn briefly to the broader policies which from time to time affect profoundly the operation of a single unit such as the Group. I therefore now submit a review of some aspects of the general situation confronting the gas industry as a whole.

Industrial, Commercial and Domestic Gas Sales

The future of town gas in industry is particularly bright; growth in industrial utilisation has been rapid, and promises to be still more rapid in the future. There is also a bright future for commercial uses of gas.

There is a tendency in certain areas towards despondency over domestic gas sales in view of decreases which have been experienced in this, the most important, market for town gas. The decline is not in every area. Somehow in all areas growth must be achieved. I believe if sales effort is properly directed, there are reasons for optimism and confidence, but in this field there is need for the greatest of all our endeavours. There are many possibilities to be exploited. Whole house warming and water heating loads are two fruitful examples of comparatively undeveloped potentialities.

Progress should have been much greater, bearing in mind the growth of new and existing towns and the thousands of new housing estates all over Great Britain. For success there is need for the removal of hire purchase restrictions on appliances; the removal of high purchase tax on appliances, especially on the gas fire; the removal of undue restrictions on advertising and publicity; and vigorous opposition to unfair and monopolistic practices such as the denial of freedom of choice to would-be gas consumers by those electricity boards who charge heavily for electric cables and services when gas is not excluded from estates, and offer free installations on condition that gas is excluded. Corporations, landlords, builders and consumers do not normally wish gas to be excluded.

In face of these difficulties we and we alone have to educate

governments, public and individual opinion to a better informed approach to the superior domestic services the gas industry has to offer. The nation has still, it seems, to do more than pay lip service to the fact that the gas industry undeniably makes the best use of the nation's coal.

Two-fuel Industry

The industry is still a two-fuel industry and is likely to be so for many years to come. Coke and the newer solid smokeless fuels must take an important place in the industry's immediate prospect of achieving smoke abatement, aided by the Clean Air Act 1956. The Act opens new possibilities of service to the industry, and we will do well to remember that we have to offer—

(a) Solid smokeless fuels,

(b) Gas—an ideal smokeless fuel on tap.

The widest use of both are to be exploited. Under the Clean Air Act, smoke control areas are permissive rather than obligatory and education of public opinion is necessary to obtain results. This demands a sustained campaign.

The Coal Board must be prepared to release domestic coal to the gas industry for production of domestic smokeless fuel. The miners will have to receive smokeless fuel instead of concessionary coal or some other equivalent if smokeless zones are to be effective in mining areas.

Note, in passing, that the coke oven industry is actively alive to the possibilities of the domestic coke market and is strenuously seeking to infiltrate. In South Lancashire although this is a coalfield, there are no large coke oven plants.

Coke is worth more than coal as a fuel, on pure efficiency and smokelessness. It must command a higher price than coal since it is a refined manufactured product. The public must realise that it takes more than a ton of coal to make a ton of coke, and when produced coke has to be conveyed, screened, stocked (and if stocked rescreened and debreezed), bagged or loaded into railway wagons or lorries, transported, delivered into storage, costed and invoiced. Superior qualities are also washed and dried before delivery.

Solid smokeless fuels will on merit command a higher price still, costing more to manufacture and having to stand the cost of handling and delivering as above. The coal/coke ratio must be kept in commercial balance, and gas prices should not subsidise coke and solid smokeless fuels. The North Western Gas Board has commenced to market a new solid smokeless fuel, perfected for household use by the Board's technologists at a price of £9 7s. 9d. per delivered ton, or 9s. 6d. per delivered cwt. bag, under the name Phimax. The new fuel was offered for sale as from Monday, January 21, and it has been developed to replace bituminous coal in open fireplaces. The Greater Manchester area is its first trial market area.

In any progressive industry there is scope for a courageous and comprehensive research programme and gas industry research is our key to the future. Living in a glass and heavy chemical industrial area, I am repeatedly reminded of this. A constantly expanding programme of research and development has made one British glass firm pioneers of the glass making industry throughout the world. Nearly all the polished plate glass in the world for example including that manufactured in the United States is made by a process perfected in St. Helens.

The choice of future raw materials for gasmaking still lies between coal, oil and coke, and possibly tonnage oxygen. But coal cannot lightly be passed by as the major raw material. The use of the now well established supplementary gas supplies will extend wherever it is possible and economic to do so, namely,

(i) Surplus coke oven gas.

(ii) Surplus refinery gas (refined or diluted).

(iii) Surplus methane from collieries (reformed or diluted) either from borings or extracted from ventilation.

(iv) Liquid methane and butane, imported or home produced.

Natural gas will be used if found. It may yet be brought from the Continent or even from the Middle East.

Gas produced by underground gasification is low grade gas and is not for town use. It is suitable for the generation of electricity or for power (gas engines).

In this sphere contractors have been called in by the Coal Board to develop the scheme. The firm will develop the scientific and engineering techniques. This illustrates a form of co-operation the gas industry should foster.

Complete Gasification

The desire to supply cheaper town gas will always be a spur to research. Complete gasification has been an attractive field for pioneer work. Technical advance in this method is necessary before success can be claimed, even though recent discoveries beget great hopes.

It has been suggested that the final solution to the complete gasification process may be the use of the Lurgi process suitably adapted. At one time Lurgi gas was produced at 400 B.Th.U. per cubic foot and needed up-grading, now it has been discovered that methane is produced in the course of gasification and does away with the need for upgrading. A wide field of thought still believes complete gasification is only likely to suit peak load conditions bearing in mind the value of solid smokeless fuels.

As regards gasification of oil, while claims are now being made for competitive plants with most of the new types of oil gasification plant, I believe lower capital and production costs than at present possible, with stability and continuity of access to this raw material are necessary before oil gasification is to be regarded as more than another adjunct principally for peak load working.

Gas Council Research

Nevertheless a new and cheaper gasmaking technique is required, particularly using coal as a raw material. If the chosen system can carbonise

(a) coal

(b) and/or oil

(c) and/or tar

in a duplicated unit sized carbonising vessel for huge weights of raw material at reasonable capital cost and low maintenance cost, with low labour force, producing pure gas at high pressure, then it has the highest promise. All these fundamentals are claimed for the latest Gas Council hydrogenation research plant.

One critical factor in assessing the choice of new gasmaking plant is the capital cost which in 1956 is 4¼ times the cost in 1936. Thus a plant costing £1 mill. in 1936 now costs £4¼ mill. The factor for civil engineering work is 3½ times. See Appendix IV.

Choice of Future Carbonising Plant

The choice of carbonising plants of the future is one of the most difficult problems the industry has from among the many interesting projects afoot on a pilot basis. There is good reason to stand firm by the vertical retort and develop it still further until more prolonged commercial results from these pilot plants are available.

The carrier gas modification is one important consideration. The capital cost of new carbonising plant is now from 3½d. to 4d. per therm. A new process at lower capital cost and or cheaper operating cost, preferably sited at a colliery, would be welcome could research achieve it.

Atomic Energy

The development of atomic energy demands close attention by the gas industry. The capital cost of nuclear power stations is said to be 2½ to 3 times greater than traditional power stations. It is obvious, therefore, that generating costs must fall by more than the increased capital cost per unit before lower operating costs are achieved. When nuclear materials are in general use who knows what the market price of raw materials will be? Will it increase in the same way that coal has increased?

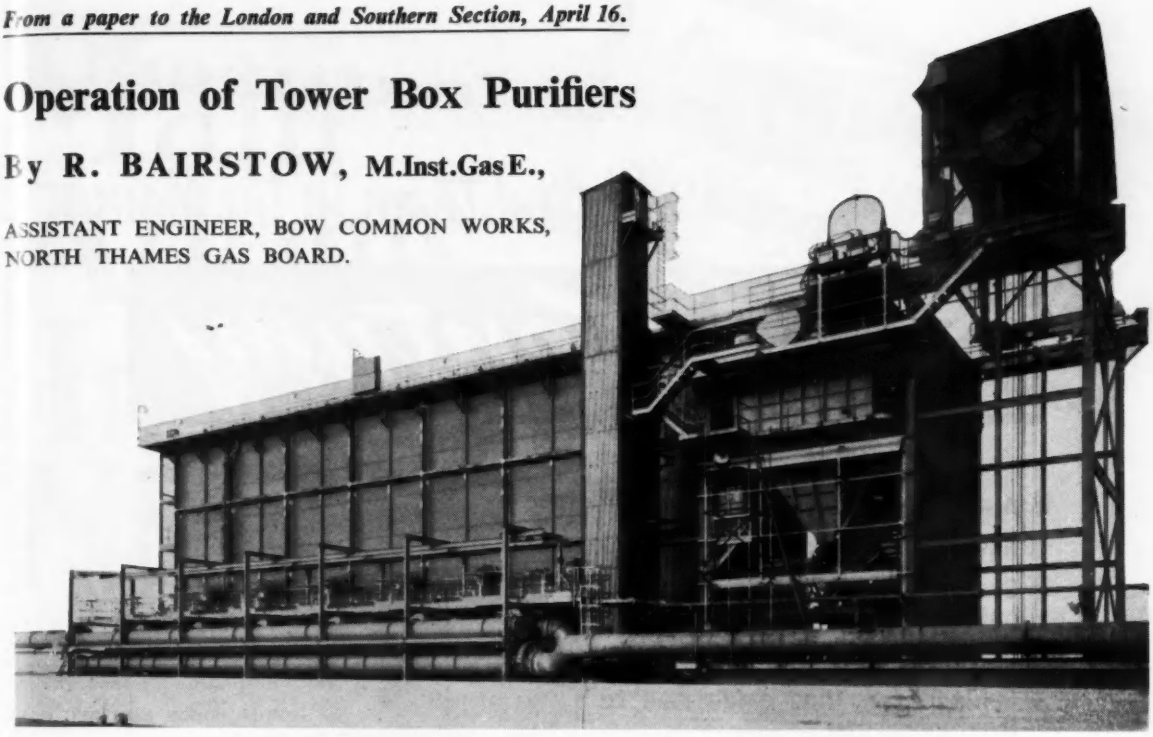
It is on record that in St. Helens Town Council as long ago as 1897 it was asked whether it was wise to extend St. Helens gasworks in view of the 'electric light.' I think this paper has given the answer to that question. Undoubtedly history will repeat itself and the question will be asked whether it is wise to extend the gasworks in view of nuclear power. I am confident that history will provide the answer for very many years to come that it is not only wise but essential.

From a paper to the London and Southern Section, April 16.

Operation of Tower Box Purifiers

By R. BAIRSTOW, M.Inst.Gas E.,

ASSISTANT ENGINEER, BOW COMMON WORKS, NORTH THAMES GAS BOARD.



Tower box installation at Southall.

THE tower box installation at Southall consists of six Balfour Lecoq tower box purifiers, a stocking frame, a travelling crane, a tray tippler, and an oxide handling plant. Five towers are normally worked and the rated capacity of the plant under these conditions is 7.5 mill. cu.ft. of coal gas per day, equivalent to 6.1 space volumes per hour. The general construction of a second installation at Bow Common is similar but smaller. It comprises five tower box purifiers, each containing 16 trays measuring 19 ft. 6 in. by 9 ft. 9 in. by 2 ft. 11½ in. deep, a stocking frame, a travelling crane, and a tray tippler. It is designed to purify 4 mill. cu.ft. of coal gas per day with four towers in the stream, the fifth being held in reserve and brought into use when one of the working towers is taken off for recharging. Under these conditions it has a rating of 6.3 space volumes per hour. The oxide from the towers is, at present, crushed in a plant attached to another set of purifiers, but arrangements are in hand to install a crushing plant at the outlet of the tippler hopper. A shuttle belt, fed by a portable conveyor, is provided for returning prepared material to the trays when recharging a tower.

The Framework

The tower purifiers in the Southall installation are constructed in one unit divided into six compartments, each tower box being rectangular and measuring 28 ft. 9½ in. by 16 ft. 3 in. in cross section and 51 ft. in height above the foundations raft.

The framework of the towers is built with compound stanchions of 12 in. by 6 in. R.S. joists and 15 ft. by 4 in. R.S. channels, together with 16 in. by 6 in. R.S. joists forming vertical guides for the trays. All horizontal cross and side bracings consist of 12 in. by 4 in. and 7 in. by 3 in. channels arranged internally. The side plates of the shell are $\frac{5}{16}$ in. plate and the bottom are $\frac{3}{8}$ in. plate, the whole being electrically welded with lap joints on the horizontal and butt joints on the vertical. The covers are made from $\frac{1}{4}$ in. plate and are domed with a central rise of 8 in. The gas-tight joint between the cover and curb is of moulded rubber.

Each tower contains 14 trays measuring 26 ft. by 13 ft. by 2 ft. 11¼ in. internally but with an overall depth of 3 ft. 6 in. The oxide in a tray is 2 ft. 3 in. deep in one layer and is supported on standard type wooden purifier grids. The trays are constructed from $\frac{5}{16}$ in. M.S. plate with 6 in. by 4 in. by $\frac{3}{8}$ in. tee stiffeners for the sides and 6 in. by 5 in. R.S. joists and channels underneath. The trays were all electrically welded in the factory and transported to the site by road. In the centre of the tray is a circular gas duct with a cup at the top and a skirting plate at the bottom so that when one tray rests on another a water seal is formed between the two. When the trays are stacked this duct forms the outlet main and extends for the full height of the tower and is sealed above the top tray by means of a removable cover.

Perfect Seal Ensured

A water supply pipe to the seal of the top tray and overflow pipes from tray to tray provide a continuous passage for irrigating water and for any condensate formed, thus ensuring maintenance at all times of a perfect seal between the central gas duct and the space above the oxide in each tray. The gas enters the tower through the connection half way up the tower shell (Fig. 2) then passes downwards through the oxide in each tray in parallel and collects in the common central duct via apertures situated between the grids and bottom plates of the trays. Each tray is fitted with four lifting lugs and two guiding brackets which engage with the vertical guides formed from the 16 in. by 6 in. R.S. joists on the tower sides.

At the tippler end of the tower structure and attached to it, is a braced framework covered with Robertson protected metal sheeting and closed on the top by means of a removable cover. This forms the stocking frame and is used to accommodate trays during emptying and refilling. The 30 in. gas connections and valves are so arranged that any of the six towers can be isolated by means of the water sealed valves while still permitting the regular rotation of the remaining working towers by means of the Westwood & Wrights mechanical valves. A 'Newton needle' gas heater is fitted to the inlet of each tower.

The tower structure is designed to carry the travelling crane on 75 lb. F.B. rail supported on 18 in. by 8 in. R.S.J. longitudinal girders. The gantry is extended beyond the stocking frame so that the crane can serve the oxide handling plant. The crane was manufactured by Strachan & Henshaw Ltd., and will lift loads up to 35 tons at a hoisting speed of 20 ft. a minute; the travelling speed of the crane is 50 ft. per minute. The attachment for lifting is a remotely controlled grappling frame with four coupled hinged grappling hooks operated by a flameproof

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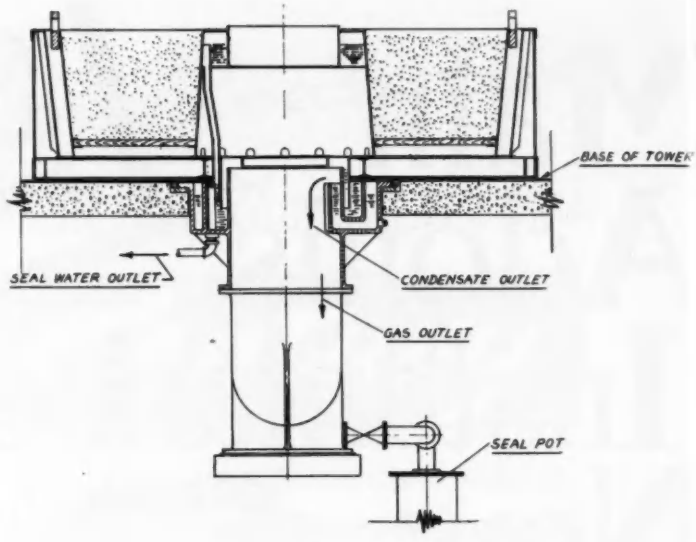

Fig. 1. Diagram giving the detail of the base of the tower and showing a full tray of oxide in position. To counteract corrosion of the tray bottom by the condensate from the gas passing through the tower, a modification is shown by which the water from the cascade water seals is being collected separately from the condensate and recirculated. The condensate in turn is run off to the ammonia liquor storage tanks.

electro-hydraulic thruster. A dial indicator for hoisting shows the exact position of the grappling frame at any instant, but the driver also has a direct view of the hoisting operation from his control cabin. The crane is equipped with vertical guides which virtually constitute an extension of the 16 in. by 6 in. R.S.J. tower guides. In this way the grappling frame and tray are always under control, with no swing being set up as the crane comes to rest after travelling.

The crane removes the trays containing fouled oxide from the towers and conveys them to the Strachan & Henshaw mechanical tippler where the charge is broken up with picks and pneumatic drills. The tippler rotates through 155° and discharges the oxide into a receiving hopper of 50 tons capacity, which is equivalent to two trays. The top of the hopper is covered by a steel bar grid, with 9 in. square openings to arrest the larger pieces of oxide. The oxide is removed from the hopper through two outlets which feed on to slow moving belts discharging into the crushing plant. This plant consists of a rigid hammer crusher, built by Jeffrey Diamond, and a disintegrator. The chutes are so arranged that these machines can be worked singly or in series or both by-passed, but difficulty was experienced from blockages in the chute feeding the disintegrator and this machine has since been removed. The crushed oxide flows to belts feeding a buffer hopper which discharges into lorries for conveyance to the storage ground. Provision has also been made to feed the crushed oxide directly back into the discharged trays. (See Fig. 3.)

Incorporated in the oxide handling plant is the tray filling plant which consists of a ground receiving hopper, two belt conveyors, a reversible shuttle belt conveyor, and a tray filling carriage. The oxide crushing plant can be used to crush oxide from other sections of the works purification system.

A brick built machinery house alongside the towers accommodates the switchgear, air blowers, oxygen recording apparatus, and the purging machine. The air for revivification is supplied by Suterbilt rotary positive Roots type air blowers, and the air mains are so arranged that air can be admitted to a box when it is in any position in the stream. The quantity of air used is measured by means of an Arkon air recorder. Permanent purge gas services are fitted to each tower at its inlet and outlet mains and also at the base of the outer shell. These services are fitted with stop valves and in addition are blanked off by spectacle valves when the tower is at work. The purge gas is produced by the controlled combustion of coal gas in a portable Holmes inert gas generator with an output of 15,000 cu.ft. per hour. The installation includes a Keighley automatic lift which serves the valve operating platform as well as the top of the plant.

Each tower is fitted with a mercury-in-steel dial thermometer with capillary tubing and bulb connected to the inlet and outlet mains, together with a U tube liquid gauge. These instruments are housed in glass fronted cabinets which have steam tracers running through them to prevent freezing during cold weather.

The water used to maintain the irrigation of the tray seals is measured through Solway 'Flowrator' gauges and these are centralised in a vertical cabinet on top of the plant. The overflows from these seals are collected in a sump at the base of the plant and pumped to the works liquor well.

A high level water storage tank, with a ball valve control, supplies water to the water sealed valves on the towers, and these are brought into operation only when a tower is out of the line for recharging. There is a 4 in. pipe attached to the top gallery, and fitted with stand-pipes, which serves as a fire emergency main. In addition to the purifiers, 400 ft. of 36 in. inlet main, 675 ft. of 36 in. outlet main and a 400,000 cu.ft. an hour Connersville meter were installed.

The purge gas in the inlet main was displaced with coal gas from the outlet of the ammonia washers and vented at a point in front of the main inlet valve to the tower boxes on December 15, 1954. At the same time the purge gas in the outlet main, towers, and tower connections was displaced with coal gas from the outlet of the works' meter and this was vented on the cover of No. 1 tower. The time taken for this change-over from purge gas to coal gas was 4½ hours.

The valves had been set for the rotation of 1, 2, 3, 4, 5 (No. 6 tower was not charged with oxide until the end of the month) and this sequence was maintained for the first 48 hours to give the towers a chance to warm up and get the oxide working. During this period the gas flow rate was 6.75 mill. cu.ft. per day, and the back pressure of each tower was 1 in. W.G. The rotation of the towers was later changed and the gas rate increased to the nominal capacity of the plant of 7.5 mill. cu.ft. per day. The established routine is to swing the towers every 24 hours. After the towers had been at work for five days the gas rate was temporarily increased to 8.5 mill. cu.ft. per day and under these conditions the back pressure of each tower was 1¾ in. W.G.

When a tower is to be taken out of line for recharging the following procedure must be followed:—

It must be kept in last taker position for at least 12 hours prior to purging and a check made that its temperature is not excessive.

All non-flameproof electrical equipment must be made 'dead.'

The inlet and outlet gas valves must be logged—this takes 20 minutes.

The tower must be vented by removing the vent plug on the cover.

The vent plug must be replaced, the water gauge read, and the tower left standing for 15 minutes to prove there is no leakage of gas into it.

Finally, if all is correct, the purging machine is started up and allowed to blow to atmosphere while the spectacle valves on the purge line to the tower are swung over. A test is then made on the purge gas leaving the machine and if this is satisfactory the stop valve on the purging line leading into the outlet main is opened wide. The vent plug

on the cover is adjusted to maintain a pressure of 2 in. w.g. throughout the purging operation.

Tests are made of the purge gas leaving the machine and the gas discharged at the cover at hourly intervals. When the analysis of the gas discharged at the cover contains 85% of the CO_2 leaving the machine, the stop valve on the purge line leading to the base of the shell is opened and the one on the outlet main closed. This point is reached after about two hours' purging. After a further ten minutes of purging, the purge gas valve to the inlet main is opened to sweep this short length of main clear of coal gas. A further ten minutes is allowed with both these valves opened and this gives a final analysis of over 91% of the CO_2, leaving the machine, discharged at the cover. The total time taken to shut a tower out of the line and to prepare it for lifting the covers is about three hours.

The trailer pump fire engine is then coupled up to the fire main, the cover fasteners removed, and the cover lifted. The portable handrails are next fitted round the top of the open tower and the water feed pipe to the seals removed. The top tray is then transferred to the tippler, the water seal emptied, the top layer of oxide broken up, and the tray tipped. When the tray is empty, the wooden grids are removed and the bottom of the tray cleared of loose oxide. Recently, this last task has been eliminated at Bow Common by laying hessian on top of the grids before charging the trays with oxide. The hessian has a life of at least three tower changes and it does not increase the back pressure thrown by the tower. The large lumps of oxide left on the receiving hopper grid are broken up, and the oxide passes through the crushing plant.

Three Methods

As these operations take more than a day to complete it has been thought desirable to replace the cover on the tower between finishing work one day and recommencing the next day. Three different methods of emptying and refilling the trays have been used on various occasions during the time the plant has been in operation.

In the first method the charging of the trays with fresh material has been carried out concurrently with the discharging process. Under this method the crane lowered the first emptied tray on to the travelling carriage at ground level where it was run under the oxide filling shuttle belt and filled in about an hour. In the meantime, the crane had transferred another full tray containing fouled material from the tower to the tippler and while this was being broken up and tipped the crane hoisted the first tray and placed it in the stocking frame. This method of working was continued until all 14 trays had been discharged and refilled. When the last fouled tray of oxide had been removed men went into the bottom of the tower through a manhole at the base and cleaned it out. The trays of fresh material were then transferred from the stocking frame to the tower.

In the second method the job was broken into two operations—emptying all the trays and storing them in the stocking frame, and filling them and placing them in the tower. The first method has the advantage that the tower being recharged is unavailable for the minimum period, but the work does not run smoothly unless the time taken to discharge a tray is approximately the same as the time required for filling one; it also makes heavy demands on labour and transport over a short period. The second method runs more smoothly and spreads the labour and transport demands, but takes longer.

The Southall installation works with five towers in stream, the freshly charged one being kept in reserve until the next change is due. The time taken for recharging this is not important, and although the first method was used initially it was later abandoned in favour of the second.

At Bow Common it has been found necessary so far, in order to maintain the designed throughput, to keep all five towers in the stream, so recharging must be completed as quickly as possible. The first method has recently been adopted at this station, with the result that a tower taken out of stream at 7.30 a.m. on a Monday, is back at work again by noon on Wednesday. Previously, when using the second method the operation took 4½ days.

By the summer of 1956 it was felt that sufficient experience had been gained in the behaviour of the towers to experiment at Southall with the third method of recharging. In this system the first tray is tipped into the receiving hopper and the empty tray is lowered on to the tray filling carriage and run under the shuttle filling belt. The crushing plant is then started up and the freshly crushed oxide passes under a large water spray, which is fitted at the end of the shuttle belt, before being fed back into the empty tray. When the tray is filled it is transferred to the stocking frame and the process continued until all trays are tipped and refilled with the freshly crushed material. This method has the advantage of eliminating the labour and transport involved in placing material to stock and reclaiming it. The size of gang required is the same as for the second method and the total time a tower is unavailable is even less than in the first method because the oxide is in a fairly dry state until it leaves the shuttle belt and therefore does not hold up in chutes and block them to the same extent as damp material. This method does not apply, of course, when it is required to replace a fully spent charge by a fresh mixture. Considerable difficulty was experienced in the early days in obtaining a smooth flow of material, particularly of new blends, through the chutes and hoppers in the oxide handling plant. A suggestion is, therefore, offered to designers of oxide handling plant to make it a golden rule that all chutes should be as nearly as possible 90° and when this is impossible to include adequate rodding holes at any point where blockages are liable to occur.

The procedure for putting a tower back to work is a reversal of the operations for taking it off, except that the final point during purging from air to purge gas is reached when the gas discharged at the cover contains not more than 3% oxygen. The oxygen content is used for control because certain new oxides may absorb CO_2.

When the plant was first commissioned Nos. 1 and 4 towers were charged with a blend of 50/50 by volume, new bog ore and part spent material; Nos. 2 and 5 were charged with a 100% part spent material and Nos. 3 and 6 with a blend of one-third new bog ore and two-thirds part spent material. This sequence was maintained until changing over to the third method for recharging the towers.

The oxide from the first six towers discharged was found to be very hard, particularly from Tower Nos. 2 and 5, the material from which was saleable. It was necessary to use pneumatic drills on all the trays and some of them required as many as seven tips before being completely empty. Later experience has shown that this abnormal hardness was mainly due to the improvised method adapted for the initial filling of the trays. By comparison, the men now prefer to use hand picks to loosen the oxide, although pneumatic drills are available for them and after one tip about 80% to 90% of the material is discharged. The fully spent charges, however, are still definitely harder than those which are part spent on discharge.

Dust Nuisance

The oxide discharged from all the trays, except the top ones, has been drier than that from ground level boxes and this causes the tipping of trays to give rise to a dust nuisance which has been partially overcome by spraying the oxide with water from jets as the tray is tipped. Live steam was admitted for a period to the inlet of the first, fourth, and fifth taker in an attempt to replace some of the moisture lost from the system during the working life of a tower. This did not prove to be very successful, probably because the construction of the towers is such that the steam has ample opportunity to condense before reaching the bed of oxide. The oxide from the top trays of all towers, however, has been quite soft and very moist, so moist in fact that it has on occasions blocked up the crusher and chutes in the handling plant. The higher moisture content of these top trays is due to condensation from the underside of the tower cover.

In view of the high rate of moisture loss, an attempt has been made to bring charges to between 20% and 25% moisture before placing them in the towers. With part spent charges the difficulty is to get the oxide to absorb enough water, and quite heavy rainfall on the prepared charge is of little consequence. With fresh mixtures containing new bog ore a serious problem occurs, since if the charge is in good condition when placed on the ground, it may during the standing and charging period, absorb enough water from rainfall to make it saturated and, therefore, be in a very unsuitable condition. As 1955 was a dry summer and the rainfall in early 1956 was below average, this problem has only recently become apparent in the opera-

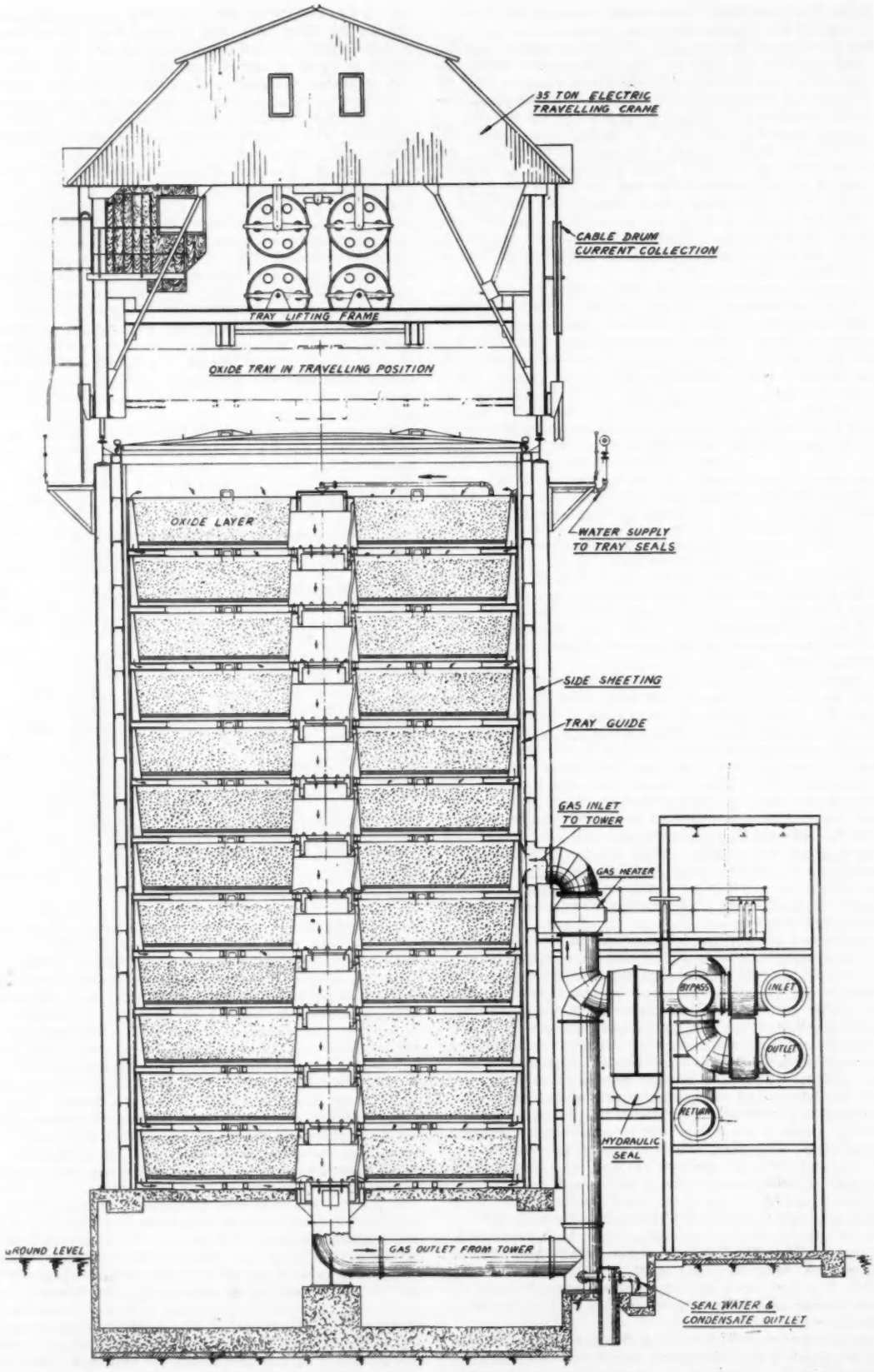

Fig. 2. Sectional diagram of a tower box purifier.

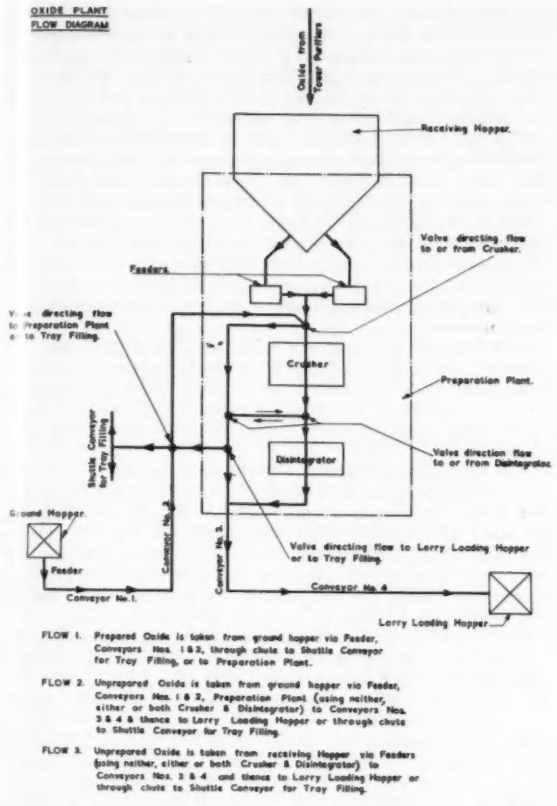
OXIDE PLANT
FLOW DIAGRAM
Oxide from Tower Purifiers
Receiving Hopper.
Valve directing flow to or from Crusher.
Feeders.
Valve directing flow to Preparation Plant or to Tray Filling.
Crusher
Preparation Plant.
Shuttle Conveyor for Tray Filling
Disintegrator
Valve direction flow to or from Disintegrator.
Ground Hopper.
Feeder
Conveyor No.1.
Conveyor No.2
Valve directing flow to Larry Loading Hopper or to Tray Filling.
Conveyor No. 4
Larry Loading Hopper
FLOW 1. Prepared Oxide is taken from ground hopper via Feeder, Conveyors Nos. 1 & 2, through chute to Shuttle Conveyor for Tray Filling, or to Preparation Plant.
FLOW 2. Unprepared Oxide is taken from ground hopper via Feeder, Conveyors Nos. 1 & 2, Preparation Plant (using neither, either or both Crusher & Disintegrator) to Conveyors Nos. 3 & 4 & thence to Larry Loading Hopper or through chute to Shuttle Conveyor for Tray Filling.
FLOW 3. Unprepared Oxide is taken from receiving Hopper via Feeders (using neither, either or both Crusher & Disintegrator) to Conveyors Nos. 3 & 4 and thence to Larry Loading Hopper or through chute to Shuttle Conveyor for Tray Filling.

Fig. 3. Flow diagram of oxide handling plant at Southall.

tion of tower box purifiers, where the volume of oxide and the time required to recharge is greater than with standard purifiers. In an effort to overcome this problem at Bow Common the fresh charge is covered with tarpaulins as soon as it is placed on the ground in readiness for recharging.

All water services and condensate drains are lagged, for protection against frost, and a live steam connection is fitted to heat the water in the storage tank supplying the water sealed valves. During the severe conditions of February, 1956, a tower was taken off the line for recharging without any difficulty being experienced from freezing of the logging water in these valves. Frost damage, however, occurred to the Flowrator gauges due to the freezing of the steam trap on the cabinet heating service; this can be prevented in future by by-passing the trap in severe weather, and also by using warm water to feed the tray seals. The irrigating water supply to the tray seals was off for five days as a result of this mishap, but when the supply was restored only a small quantity of water was required to re-establish their overflows. Although condensate drains were also frozen, it was possible to keep them flowing by the application of live steam from hoses. The fact that the gas and water connections on the Southall plant face south probably reduced the effects of the severe weather conditions to a certain extent.

To prevent corrosion of steelwork, the inside of the towers and all of the trays were treated with two coats of a tar base paint during construction and the general condition of most of the steelwork is very good after two years' work. It has been found, however, that the insides of the tray bottoms are severely pitted in small areas where condensate from the oxide lies in hollows formed by slight buckling of the tray floor plates. This could have serious consequences and methods for its prevention are being considered.

The oxygen recorder referred to earlier in this paper was fitted to the outlet main as an experiment and the amount of air admitted was manually controlled to maintain an oxygen content of 0.6% to 0.7% at the outlet of the stream. First box air admission was practised during the first five months and only slight adjustments were necessary to maintain these conditions. When air admission was changed to the second taker, a difference immediately became apparent in that a high removal of oxygen took place in the first four or five hours after 'swinging' followed by a high slip of oxygen for the rest of the period the tower was in second position. It was clearly shown that the sulphided oxide produced while the tower was in first taker position was susceptible to very rapid oxidation as soon as it came into the second position where the air for revivification was added.

The labour involved in discharging and refilling the trays, including operating the crane and crushing the oxide, is carried out by a gang of four men. When using the second method—emptying all the trays and then refilling them with material from the stocking ground—it takes seven days to complete the work. The cost of changing the purifying material in a tower per cu. yard using this method of working, is as follows:—

For labour changing the material	2s. 9d.
For transport to and from stocking ground ...	3s. 8d.
For loading material at stocking ground ...	0s. 11d.
Power	0s. 5½d.
Total	7s. 9½d.

The gang of four men take four days to carry out the work when using the third method—returning the freshly crushed oxide to the trays. The total cost at 2s. 1½d. per cu. yard of material in a tower, shows a considerable saving over the second method due to the elimination of transport and loading charges, together with the shorter time required to complete the work.

An analysis of 'in' and 'out' sample of oxide shows that the most satisfactory conditions of working were found when the oxide had been exposed to 100-110 mill. cu.ft. of gas in the first taker position. The efficiency of H_2S removal compares well with that obtained from conventional boxes, but the author is of the opinion that this could be improved by admitting the gas at two or even three points up the side of the shell instead of at one central point. Tests were carried out to investigate whether the distribution of gas was causing uneven working of the trays. It was suspected that the trays nearest to the inlet, i.e., trays 4 to 9 were doing more work than the other trays in the tower, because these trays always contained harder oxide. Examination of the results shows, however, that the position of the tray which had the maximum sulphur content (on the dry basis) in any one tower varied considerably from tower to tower. On the other hand, if an average is taken of these results, tray No. 8 appears to have the highest sulphur content and tray 14 the lowest. Assuming that all the trays in any tower were charged with material of exactly the same sulphur content, it would appear from these averages that more gas passed through trays 6 to 9 and that better distribution might result from admitting the gas at two points, say at No. 5 and at No. 9.

The chief advantage claimed for this type of purifier installation is the elimination of arduous manual labour and this claim has been fully justified from operating experience. A further distinct advantage is the small gang required to carry out the work of changing the material in the towers. The cost, per cu. yard of material in a vessel, for changing the oxide using the second method is approximately the same as that for changing, crushing and handling the material in a set of overhead box purifiers, but by using the third method the cost is considerably less as already explained. A further reduction could be obtained by using 100% new bog ore, provided it was sufficiently fibrous, to charge the towers. By this means it would be possible to cut down the transport charges by a half, since these would be incurred only when the charge was first placed in the tower and again when it was worked up to a saleable condition.

DISCUSSION

Mr. D. C. Bertram, Southall, who opened the discussion which followed, said that Mr. Bairstow had supervised the construction and working of the tower box purifier plant at Southall, and so was particularly well qualified to describe the plant in detail and to have a very good idea of what to look for and how to counteract snags as they appeared.

At Southall after the war the purifier installation consisted of two streams of three 50 ft. by 50 ft. boxes, and one catch

box. When the new water gas was installed, extra purifier capacity was necessary and it was decided to consider erecting a tower box plant to purify 7.5 mill. cu.ft. of coal gas per day and switching the C.W.G. to the conventional purifier plant as then installed.

The decision to build this particular type of plant was influenced by the shortage of suitable labour for changing the boxes, since 12-men gangs were particularly difficult to get, and as things have turned out four men only are needed for changing the trays. This involves the movement of 350 tons of oxide by the third method in three to four days. The compactness of design, the small amount of ground space occupied for the volume of gas purified, and the mechanical handling arrangements, all influenced the decision to install this type of plant. The grouping of the valves on one platform provided an extremely simple means of manipulating the direction of the flow of gas and the 'swinging' of the boxes, and the provision of a lift to the operating stages gave easy access.

The working of this installation has shown remarkably low back-pressures, which have only amounted to a total of 6 in. W.G. when all six boxes were in operation. In the conventional form of purifier box installation working under full load in the depths of a cold winter, a back-pressure of 8-10 in. W.G. might easily appear across one vessel at some critical moment when it would be quite impossible to take it out of the gas stream to change the oxide. In the new tower box installation such crises are unlikely to occur. This is a very big advantage.

The handling of oxide, by tipping the trays, at first demanded a good deal of manual labour, but during the time the installation has been working, this has steadily decreased and now virtually none is needed, since 95% of the oxide contained in a tray is accounted for in the first tipping. If the tray is now returned to its original position, and any oxide adhering to the gussets, the central tube, or in the corners is loosened, the remaining 5% is out of the tray on the second tipping.

To make certain that the optimum conditions of working are attained both in gas purification and the handling and conditioning of the oxide, it is necessary to set a limit on the volume of gas passed through any tower in the first taker position, and to prepare the oxide most carefully. The limit set on the volume passed to the tower in this first taker position is 100-110 mill. cu.ft.

The provision of tapering sides to the trays, it seemed, would help towards their easier handling, and, in fact, some trays were modified in this way but no advantage was gained and any such modifications have been found unnecessary.

During the period over which the tower box installation has been working partly spent oxide has been found to be adequately revivified by merely passing it through the disintegrator and back to the tray at ground level, without any special revivification having to be resorted to. This has saved much time and valuable space.

Corrosion of the trays by liquor condensing on the bottom of the tray is a problem which is causing some worry, and experiments have been carried out in the use of certain protective paints; the setting up of a research laboratory by Henry Balfour & Co., Ltd., may be able to solve this problem by incorporating special alloys in the construction of the tray bottom. Experience at Southall shows pitting and the formation of hollows about the size of a farthing on the tray bottom to a depth of $\frac{1}{4}$ in. in a $\frac{5}{16}$-in. plate after a working period of two years. Such corrosion may be considered severe. The installation at Southall is only the second in the country, the first being at Rotherham, and modifications may have been made in design to overcome the snags already met with.

Mr. L. R. Meek, H. Balfour & Co., Ltd., pointed out that in the Balfour six-tower installation one tower can be taken off, leaving five towers working without the provision of a special stocking tower as is necessary with other systems. In fact, by manipulating valves any tower could become a stocking tower.

Referring to tapering the sides of the boxes, this now appeared to be unnecessary but in the latest designs care had been taken to avoid putting gusset stays and strengtheners in the trays so that an unobstructed surface was presented to the oxide; this made it much easier to dispose of the oxide contained in the trays.

The corrosion of the trays could be reduced by separating the condensed liquor and passing it to the ammonia storage. The water for sealing purposes could be cascaded from seal to seal and remain uncontaminated by liquor. At the Rotherham plant, corrosion had been noticed on the tray sides only, and at this plant it was due to acidic corrosion because the charge had not been properly neutralised. Perhaps this might also be true at Southall or Bow Common.

The bad distribution of gas appeared to be affected by the proportion of height to cross section and it was particularly noticeable in a tall narrow tower with a single inlet. In later designs, there would be a better performance but slightly greater back-pressure.

Mr. L. A. Ravald, N.T.G.B., Fulham Laboratory, said that from the gas industry's long experience in the use of cast iron and its shorter experience with that of mild steel in the construction of purifiers, it was expected that there would be some attack of the steel from the action of the H_2S in the gas and the ammonium thiocyanate present in the 'oxide' or drainage. During operation, corrosion of purifiers by these compounds is normally slow and is more or less uniformly spread over the surface in contact with the respective corrodant.

In the tower and tower box installations in the North Thames Gas Board, there have occurred severe attacks of the upper faces of the tray floors, on which lies 'oxide' debris which has dropped through the wooden grids supporting the 'oxide' bed. The attack is localised and takes the form of deep bowl-shaped cavities in the floor-plates, which are of either $\frac{1}{4}$ in. or $\frac{5}{16}$ in. thickness. The rate of penetration at the cavities is estimated at $\frac{1}{16}$ in. to $\frac{1}{8}$ in. per year and such cavities could easily become perforations with serious results on the overall complete removal of H_2S.

Left, a tray is seen being tipped and just at the point when the tippler counter-balanced arms are engaging. Right, the tray is seen back in position after the second tip. The men are breaking away the oxide left adhering to the gusset plates, centre tube and corners.

These two corrodants, H_2S and ammonium thiocyanate, are considered to be incapable of corroding steel so severely in the prevailing conditions of plant operation with only about 1% of oxygen in the gas and it is significant that steel not in contact with wet oxide has not been attacked in the same way or to the same extent. Here the attack has been uniform.

From information by J. R. West in an issue of the American journal, *Chemical and Metallurgical Engineering*, in 1946, we began to carry out a few tentative experiments in 1951 and confirmed that elemental sulphur attacked steel in wet conditions. Our results also showed that attack could proceed under oxygen-free conditions, but the matter could not be pursued at that time. In 1953, however, an article by Farrer and Wormwell of the Chemical Research Laboratory, Teddington, in *Chemistry and Industry*, emphasised the rapidity of the attack in wet conditions. The appropriate results have been confirmed and applied to the present problem and introduce a cause of the corrosion of purifiers which has not been widely appreciated hitherto.

Three Conditions

For this cause of corrosion there are three necessary conditions—the 'oxide' must contain elemental sulphur, there must be present water as liquid if the attack is to be significant, and there must be physical contact between the steel and the 'oxide.' Water lodges in isolated depressions in the tray-floor, which is usually sprinkled with oxide debris. Once a cavity has been formed by corrosion, it constitutes a natural receptacle for water which enables the attack to continue. Increase of temperature has a profound effect on the rate of attack on steel by sulphur. Particle size, too, has an influence, since the smaller the size, the more rapid is the attack; and so any oxide dust passing through hessian laid on the grids under certain conditions may accentuate the attack. The rate of attack increases with the sulphur content of the oxide, especially when this is greater than 20%, but the control of the pH value is no solution to this corrosion problem.

Most oxide is contaminated with oily matter and this, with residual patches of paint which may be on the steel, may hinder intimate contact between the sulphur and the steel. This tends to make the attack haphazard, restricting it, in the low lying areas, to certain spots at which cavities up to an inch or so in diameter are formed. The presence of mill scale does not prevent attack.

The initial corrosion product tends to migrate away from the steel surface and therefore does not stifle the attack and although the precise corrosion mechanism will not be discussed now, this initial product has been found to be mainly ferrous sulphide with secondary products which include considerable amounts of iron ferrocyanides.

Corrosion by 'oxide,' therefore, can proceed continuously, as long as the three conditions prevail even in the absence of oxygen; that is, it can proceed whether the plant is in operation or open to air. The oxygen in the gas, however, is likely to assist the attack.

Whether it is necessary to protect the internal steelwork can be debatable. The availability of spare trays, ability to withdraw trays for appreciable periods, facilities for moving trays to a site where repairs can be made, availability and cost of new steel plate, and the cost of repair work, have all to be considered. With no spare trays available and plant working to full capacity, a decision was taken to treat selected trays, withdrawn in turn for periods of a few days.

After priming the surface with a bituminous varnish, there was laid down a layer, at least of ¼ in. thickness, of a hot-applied special coal tar product, reinforced by glass fabric, similar to the coating used on underground mains. The reinforcement was considered necessary to counteract the distortion of the trays on tipping and the need for a surface able to withstand occasional treading and light shovelling. The coating was continued up the sides for several inches to seal the angles. This method was considered to be the most readily applicable and possibly the cheapest in the circumstances. Other bituminous materials are being considered.

Several methods for the protection of mild steel in purifiers have been tried in the past, in the form of test plates. Plates, metallised with aluminium and with lead, were unsatisfactory; so were cement washes. A neoprene coating was shown to be a possibility but expensive, and other plastic coatings are being considered. They are all costly and require special surface preparation of the steel. Unfortunately most paint systems are unlikely to withstand treading and shovelling. A false floor of resin-bonded plywood, laid on soft pitch, is one of several alternative suggestions, but in existing installations, it is probably uneconomic to attempt to protect surfaces other than the tray-floors because of the high cost of surface cleaning. In respect of future installations, however, the present proposal is to protect the upper faces of the tray-floors in one of the ways already tried and the remaining surfaces of the trays and the shell by bituminous paint applied over a red lead shopcoat.

In those installations dealing with gas liable to deposit condensable oils, the bituminous coating will be protected, as far as possible, from dissolution by a coat of an oil-resistant paint of the alcohol-solvent road-making type. There are indications already that with gas containing such condensable oils, at or near saturation point, unprotected unreinforced bituminous coatings suffer by absorption of oily vapours, leading to cracking of the layer when the absorbed oils subsequently evaporate on exposure of the layer to air. Fabric reinforcement appears to mitigate this defect but it may not prevent eventual deterioration of the coating. The filtering action of the oxide bed, however, appears to remove oils to a degree that makes possible the use of unprotected reinforced bituminous coatings for tray-floors.

Mr. J. C. Hogg, S.G.B., Production Engineer, Bournemouth, said there seemed to be three papers to reply to but there were two salient points of outstanding interest. One was corrosion and the other moisture. Of corrosion, it must be considered that in a tower box purifier there was 14 streams in parallel and each was a potential source of corrosion. Welded steel purifier boxes had been in use 27 years ago and some form of protective covering had been found necessary. A coating of protective oxide on the side plates and concrete had been used for the bottom of the box. It had not been completely satisfactory but it had been reasonably effective.

On the second point, moisture, large volumes of water were being moved round the tower by the daily rotation of the towers from the different taker positions and this amount of water might be as much as 14,000 gal. a day. This would account for the very small evaporation of water at the seals, but it would be interesting to know what the rate of loss of moisture from each box really was, since the rate of evaporation from a 14-tray box appeared to vary between 25% and 14%, and seemed to be related to the different sulphur content in different trays in the same box. Here was a migration of moisture instead of oxide.

Mr. A. H. Savill, S.E.G.B., Divisional Engineer, West Surrey, spoke of the tower gas purifier plant at Wandsworth. Here the first tower purifier plant to be installed in Great Britain was erected in 1938. It had been necessary to install extra purifier capacity in a hurry and this type of plant had certain important advantages—it was cheaper to install, it took up less space, and there was a great saving of time during which purifiers were out of action.

Installation Extended

After the war, the installation was added to with some changes in design, principally the provision of fewer reversing valves, but purging arrangements remained the same and, as suitable labour, though more expensive, was not scarce, the means of oxide handling were unchanged. In this installation it was possible completely to foul a charge after two exposures though latterly a charge has been fouled to 51% of sulphur in one exposure. The conditions at Wandsworth were slightly easier since the high hydrogen sulphide content of 750 grains per 100 cu.ft. at Southall was much greater than that at Wandsworth; they were also assisted by mixing the coal gas with water gas. Corrosion, too, was not so serious since there was no bottom plate underneath the trays; in fact, an original steelwork container had lasted from 1938 to 1953, but latterly the effect had been more noticeable, especially on outside plates, though most of the wear was in the upper tier. Tar based paint appeared to be as good a protection as any and the rubber joint rings had given no trouble. These were changed every time a tower was recharged but it was generally agreed that water seals were the best sealing medium.

The analysis of the oxide on the trays showed that the sulphur content was not uniform throughout the tower which pointed to a lack of uniformity in gas distribution similar to that found in the conventional box purifier.

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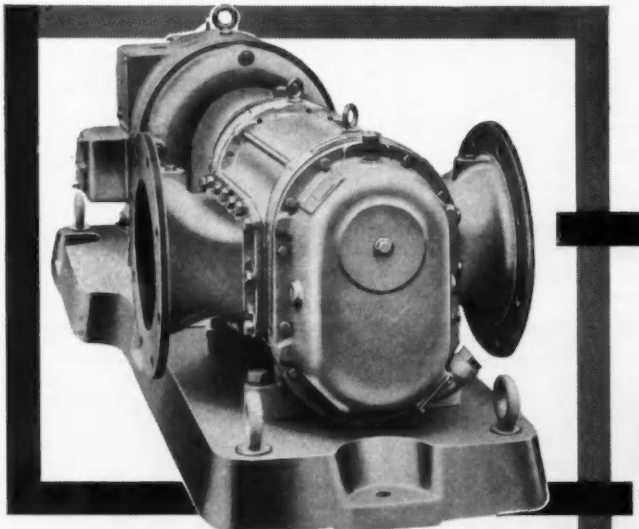
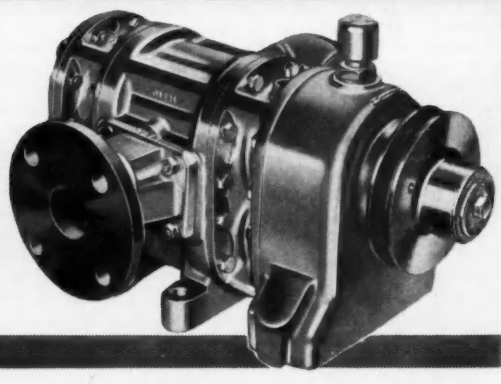


Godfrey Gas Boosters



Positive displacement gas boosters, designed and manufactured by Sir George Godfrey & Partners (Industrial) Ltd., are simple in construction, and easy to install. These machines are widely used in many industries for handling most commercially used gases, including towns' gas. Special sealing ensures freedom from oil contamination. Performance: Gas flow up to 3,500 cfm at pressures up to 10 psi. Also available: Industrial blowers, vacuum pumps, superchargers, diaphragm pumps, relief valves, etc.

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PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/6d.; by post 1/8d.

Subscription Rates:—65/- per annum; (Payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 2/6 per line (approx. 7 words)—minimum charge 10/-. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10 in. deep × 7 in. wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.

SOUTHERN & MIDLANDS REPRESENTATIVE: A. Engelhardt, T.D., 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Fleet Street 2236-7.

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FOR SALE.—Unused Walworth Lubricated Valves at ordinary Gland Cock prices. 2 in. and 3 in. screwed, 3 in. and 4 in. flanged. Cleckheaton Engineering Co. Ltd., Cleckheaton, Yorks. Phone 397.

SPECIAL OFFER: Large quantity of new cast iron fullway valves, all iron parts, 8 in., 10 in., 12 in and 14 in. for sale. The Midland Iron & Hardware Co. (Cradley Heath) Ltd., Cradley Heath, Staffs. Tel.: Cradley Heath 6264 and 5.

EDUCATIONAL

THE UNIVERSITY OF LEEDS

GAS PLANT MANUFACTURERS' DEVELOPMENT COUNCIL SCHOLARSHIP

APPLICATIONS are invited for the above Scholarship of a value of £350 a year. The Scholarship is provided to enable promising students to follow an Honours course in either Gas Engineering or Chemical Engineering as preliminary training for entry into the Gas Plant Industry.

The Scholarship is open to applicants of British Nationality from school or from industry; among the latter preference will be given to candidates already engaged in the Gas Plant Industry.

Applications should reach the Registrar, The University, Leeds, 2, from whom further particulars and forms of application may be obtained, not later than June 30, 1957.

SECOND DEMPSTER TRAVELLING FELLOWSHIP

APPLICATIONS are invited, before May 31, 1957, for the SECOND DEMPSTER TRAVELLING FELLOWSHIP of The Institution of Gas Engineers. The Fellow will be required to make, during a stay of up to 4 months on the Continent, a study of recent technical developments, in Belgium, France, Germany, Holland and Italy in the use of gas in industry. Applicants must not be more than 30 years of age, with some practical experience of industrial applications of gas, and should preferably be Corporate Members of The Institution of Gas Engineers. The value of the Fellowship (including subsistence and travelling expenses) will be up to £350. Conditions from the Secretary, The Institution of Gas Engineers, 17, Grosvenor Crescent, London, S.W.1.

APPOINTMENTS VACANT

PLANT OPERATING ENGINEER

LARGE North Midlands concern has vacancies for PLANT OPERATING STAFF. Duties involve commissioning, supervision and performance testing of plant in various parts of the country. Applicants should be aged 24-30; previous experience in Chemical Works, Gasworks or Coke Oven By-Product Plant will be an advantage. These are Staff appointments and there are good prospects for capable engineers. Please reply to No. 322, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WEST MIDLANDS GAS BOARD

BOARD HEADQUARTERS—
AREA LABORATORIES, BIRMINGHAM
ASSISTANT CHEMIST

CANDIDATES should have the Higher National Certificate, or Intermediate B.Sc., degree in Chemistry.

The salary will be within APT. Grade 7 (£705-£785 per annum) of the National Salary Scales.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to the Industrial Relations Officer, West Midlands Gas Board, 6, Augustus Road, Edgbaston, Birmingham 15, to reach him not later than May 13, 1957.

K. W. NEVETT,
Industrial Relations Officer.

WEST MIDLANDS GAS BOARD

NORTH STAFFORDSHIRE DIVISION—
STOKE-ON-TRENT DISTRICT
TECHNICAL ASSISTANT

APPLICATIONS are invited for the above position, at the Etruria Gas Works, Stoke-on-Trent.

Possession of the Ordinary or Higher Grade Certificate in Gas Engineering will be an advantage.

Preference will be given to candidates who have had experience in the operation and maintenance of West's Continuous Vertical Retorts and are conversant with all routine tests appertaining to the working of the plant.

The salary for the post will be in accordance with APT. Grade 5 (£605 x 20—£685 p.a.) of the National Salary Scales.

The post is pensionable, and the successful candidate may be required to pass a medical examination.

Applications, stating age, education and experience, together with the names of two referees, should be addressed to Mr. J. E. Stanier, Divisional General Manager, West Midlands Gas Board, Etruscan Street, Etruria, Stoke-on-Trent, to reach him by not later than May 13, 1957.

K. W. NEVETT,
Industrial Relations Officer.

(*Classified advertisements continued on page* 254)

APPOINTMENTS VACANT *(ctd.)*

ENGINEER familiar with the gas and/or coke-oven industry and works practice, who can write clear and concise English, required for monthly technical journal. No. 323 *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

SCOTTISH GAS BOARD

EDINBURGH AND SOUTH-EASTERN DIVISION

APPLICATIONS are invited for the following positions:

PRODUCTION ENGINEER—Armadale Works

Applicants should be Corporate Members of The Institution of Gas Engineers and should have experience in all aspects of gas production, with knowledge of horizontal retort operation an advantage. The successful candidate will be responsible to the Deputy General Manager for production at the Armadale Works. (Annual Make: 460 million cubic feet.) Housing accommodation will be available. The salary will be within Grade A.P.T. 10A.

TECHNICAL ASSISTANT TO THE DEPUTY GENERAL MANAGER

Applicants should be Corporate Members of The Institution of Gas Engineers and should have experience of all aspects of gas production. The successful candidate will be required to assist the Deputy General Manager in all matters relating to gas manufacture within the Division. The salary will be within Grade A.P.T. 9/10A according to age and experience.

The above posts are pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, giving details of education, training, qualifications and experience, together with the names of two referees should be addressed to the undersigned within 14 days of the appearance of this advertisement.

DAVID BEAVIS,
General Manager.

15, Calton Hill,
Edinburgh, 1.

SCOTTISH GAS BOARD

NORTHERN DIVISION

APPLICATIONS are invited for the following appointments on the staff of the General Manager at the Headquarters of the Northern Division of the Board in Aberdeen:

1. DIVISIONAL PERSONNEL, WELFARE AND TRAINING OFFICER:

Applicants should have sound knowledge of personnel management and practical experience of training and welfare within industry, preferably within the gas industry. The salary will be within Grade A.P.T. 10 £820-£920 per annum.

2. FITTINGS SUPERINTENDENT:

Applicant should possess at least the Full Technological Certificate in Gas Fitting of the City and Guilds of London Institute or equivalent qualification and must have wide experience in the control of gas fitting and maintenance work. The successful candidate will be responsible along with the Service Supervisor to the Divisional Service and Sales Manager for the organisation and administration of the gas fitting and maintenance department. The salary will be within Grade A.P.T. 8 £710-£790 per annum.

The commencing salary in each case will be dependent on qualifications and experience.

The above posts are pensionable and the successful applicants will be required to pass a medical examination.

Applications stating age, and giving particulars of education, training, experience and qualifications, together with the names of two referees, should be addressed to the undersigned within fourteen days of the appearance of this advertisement.

A. T. HERD,
Secretary.

26, Drumsheugh Gardens
Edinburgh, 3.

April 23, 1957.

SCOTTISH GAS BOARD

NORTHERN DIVISION

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT with duties at Inverness and undertakings in the north of Scotland.

Applicants should be technically qualified and experienced in Gas Works control and in the operation of vertical and horizontal retorts and of Carburetted Water Gas Plants.

The salary applicable to the post will be within Grades A.P.T. 6/7 of the National Salary Scales for Gas Staffs Provincial "A" (£610-£750 per annum).

The position is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, and giving particulars of education, training, experience and qualifications, together with the names of two referees, should be addressed to the undersigned to arrive within fourteen days of the appearance of this advertisement.

H. S. MILNE,
General Manager.

50, Cotton Street,
Aberdeen.

April 18, 1957.

SCOTTISH GAS BOARD

CENTRAL DIVISION
DIVISIONAL FINANCIAL AND ADMINISTRATIVE OFFICER

APPLICATIONS are invited for the post of Divisional Financial and Administrative Officer at the Headquarters of the Central Division of the Board in Perth.

Applicants must have a recognised accountancy qualification together with sound experience of financial and accountancy organisation and the ability to direct and control a large staff. Experience of mechanised systems appropriate to a large public undertaking would be an added recommendation.

The commencing salary will be within Group E. £1,525-£1,725 per annum of the National Salaries Table for Senior Officers, with placing according to qualifications and experience

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, and giving particulars of education, training, experience and qualifications, together with the names of two referees, should be addressed to the undersigned within fourteen (14) days of the appearance of this advertisement.

A. T. HERD,
Secretary.

26, Drumsheugh Gardens,
Edinburgh, 3.

April 23, 1957.

WALES GAS BOARD

LLANDRINDOD WELLS UNDERTAKING
ENGINEER & MANAGER

APPLICATIONS are invited for the position of ENGINEER and MANAGER of the Llandrindod Wells Undertaking at a salary within Staff Salary Scale A.P.T. 8 (Provincial "B" £695/£775 p.a.). The post is pensionable. Housing accommodation away from the Works is available at a reasonable rental.

Applicants should possess sound experience in gas manufacture and distribution and be capable of carrying out successfully the administrative and commercial duties of the post.

The successful applicant will be required to pass a medical examination.

The annual output of gas of the Undertaking is approximately 20 mill. cu.ft. and the consumers total 900/1,000.

Applications for the above appointment, stating age, qualifications and experience, and present position, together with the names of two referees should reach the undersigned not later than May 20, 1957.

C. B. MAWER,
Secretary.

Wales Gas Board,
2, Windsor Place,
Cardiff.

ROYAL TECHNICAL COLLEGE, SALFORD

ACTING PRINCIPAL, J. F. YATES, B.Sc., M.Sc., M.I.E.E.

THE Governors of the College, which has now been designated a College of Advanced Technology, invite applications for the post of SENIOR LECTURER IN GAS ENGINEERING from suitably qualified candidates who should be Corporate Members of the Institution of Gas Engineers and/or should possess a University Degree or other equivalent qualification. Teaching experience is desirable and industrial experience is essential.

Applicants should be capable of teaching Gas Engineering, with special reference to Distribution.

Salary in accordance with the Burnham Technical Scale, 1956, viz., £1,350-£1,550 (men).

For further particulars and forms of application please send a stamped addressed envelope to the Acting Principal, Royal Technical College, Salford 5, to whom applications should be returned as soon as possible.

R. RIBBLESDALE THORNTON,
Clerk to the Governors.

NATIONAL COAL BOARD

NORTH EASTERN DIVISION

ASSISTANT DIVISIONAL CARBONISATION ENGINEERS, 2 posts, required at the Divisional Carbonisation Headquarters, Sheffield. Salary range £1,175/£1,700 or £900/£1,250 according to qualification and experience of the men selected.

Applicants are required to have had substantial drawing office experience in the design and layout of modern coke oven and by-product plants, and to have held responsible position in an engineering capacity at such or in the Chemical Engineering Industry. General experience required in constructional, mechanical, civil and chemical engineering. The appointed Engineers must be capable of taking full responsibility for the section of development scheme work and construction allocated to them.

Apply giving full details to Staff Director, N.C.B., N.E. Div., Holmwood House, Ecclesall Road South, Sheffield, 11, by May 18, 1957.

Mark envelopes Staff Vacancy.

NATIONAL COAL BOARD

NORTH EASTERN DIVISION

DIVISIONAL CHIEF CARBONISATION OFFICERS, 2 posts, required for the Divisional Carbonisation Headquarters, Sheffield. Salary Range £2,000/£2,500.

Selected candidates will be directly responsible to the Divisional Carbonisation Director for (a) the planning and progressing of new projects, and (b) the operational control of all carbonisation activities within the Division respectively.

Applicants must have had wide experience in the design and operation of modern coke ovens and by-product recovery plant, including secondary processing, and be conversant with trends in future developments. Technical ability is essential, and a recognised qualification in engineering or science is desirable.

Apply, giving full details to, Staff Director, N.C.B., N.E. Div., Holwood House, Ecclesall Road South, Sheffield, 11, by May 18, 1957.

Mark envelopes Staff Vacancy.

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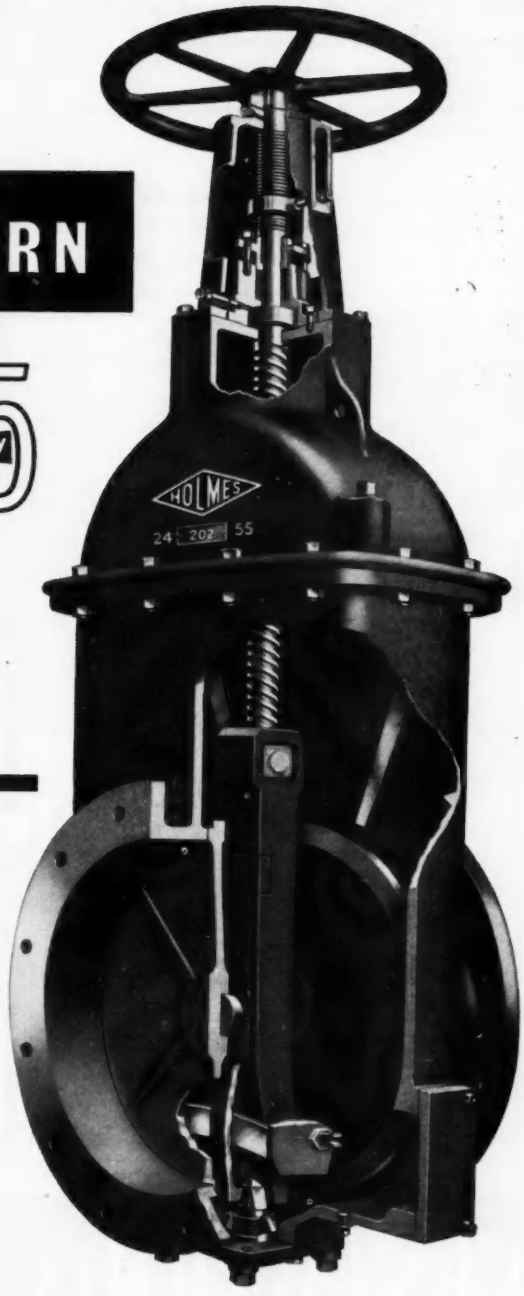

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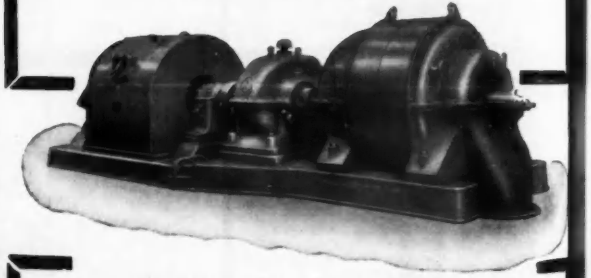

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